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1997-98 A Review







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-A REVIEW

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PREFACE

The IAR which was initially published as the report of the DG in India on the occasion of the tenth meeting of the Central Advisory board of Archaeology is a valuable work of reference. The reports incorporated in this issue are the outcome of researches undertaken on (1) Excavations and Explorations (2) Epigraphy (3) Numismatic & Treasure Trove (4) Other Important Discoveries (5) Radiocarbon Dating (6) Palaeobotany (7) Museums (8) Architectural Survey (9) Structural & Chemical Preservation of Monuments (10) Archaeological Chemistry (11) Archaeological Gardens & (12) Publications. This is the forty-fifth issue of the IAR, which contains an **Article Index** to *Ancient India* as an Appendix.

As I have mentioned in the preface of an earlier issue (1996-97), we are trying to minimize the gap in printing that occurred mainly due to non-submission of material, not only by the State Departments of Archaeology/ Institutions and Universities but also by my colleagues in the Survey. Here, I would like to stress, that in order to bring out the IAR timely, everybody's cooperation is essential.

For the vast and painstaking work of sorting out, compiling, editing, proofreading and making the copy press-ready, I am deeply beholden to Dr B.R. Mani (Superintending Archaeologist, Publication), Dr (Miss) Arundhati Banerji (Dy. Superintending Archaeologist, Publication) and Dr Piyush Bhatt (Assistant Archaeologist, Publication). My thanks are also due to Shri Hoshiar Singh (Production Officer, Publication) and the rest of the staff of the Publication Section besides Shri Vijay Kumar (Chief Artist), Shri Rakesh Chander (Senior Artist), Shri Baldev Singh (Draftsman, Grade II) and Shri Puran Chand Mukhiya (Marksman) of the Drawing Section for improving the drawings incorporated in this issue. Without everybody's support this issue would not have seen the light of day.

The design, layout, editorial corrections, etc., have been done by Shri Abhishek Biswas and Shri Bharat Bhushan Upadhyay for which I am thankful. Mr. Anil Kochar of Public Printing (Delhi) Services also deserves my special thanks for bringing out this issue in the shortest possible time.

(KASTURI GUPTA MENON)
DIRECTOR GENERAL

New Delhi

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INDIAN ARCHAEOLOGY 1997-98 -A REVIEW

EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXCAVATION AT LANJAPATRAGANDI TEMPLE, WARANGAL FORT, DISTRICT WARANGAL

The Hyderabad Circle of the Archaeological Survey of India[1], under the direction of S.V.P. Halakatti, assisted by G.S. Narasimhan, T.C. Ratnam, A. Suresh, V. Kanaka Raju, I.V.M. Sarma, S.A. Jaleel, B. Subba Rao, Ch. Yadagiri Reddy and G. Maheshwari carried out excavation at Warangal Fort with the aim of studying the locational significance of the buried temples under the mud fort rampart *vis-a-vis* the lay out of Warangal and its relationsnip with the inner stone fortification and the structures inside. In the first instance excavation was conducted at Lanjapatragandi to expose the temple, which is partially buried and visible on the surface. The visible portion of the temple is *trikutachala* on plan with three shrines facing north, south and east with *sikharas* of central and southern shrines, buried under the mud rampart while the *sikhara* of the northern shrine was lost (pl. 1). The excavation here has exposed ruined original brick-built, lime-plastered and stucco decorated *sikharas* over the central and southern shrines, which are of *bhumija* variety, rarely noticed in temples of Kakatiya period. Over the roof of 'the *garbhagriha* of the southern sub-shrine, inside the *sikhara* at its northeastern corner were found a small gold sheet of rectangular shape measuring 3 x 2.8 cm and embossed with figures of god and goddess and a few copper objects of ritual purpose *viz.,* two small dishes, a lamp with five wicks having elongated handle (pl. 2), a small tripod, one small globular copper pot with short spout (pl. 3) and two iron knives. Apart from these objects, nearly twenty miniature grey ware vessels (pl. 4) arranged in rows were also found in the south-east corner of the above place.

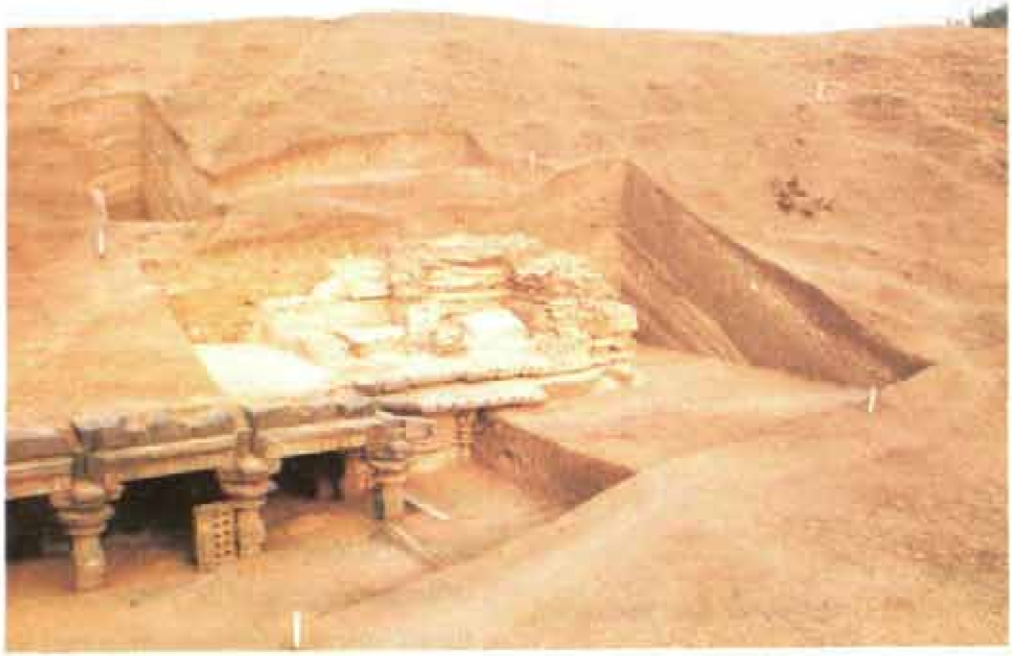
ARUNACHAL PRADESH

2. EXPLORATION IN THE DISTRICT WEST KAMENG

Archaeological exploration had been conducted by the Directorate of Research, Government of Arunachal Pradesh, Itanagar, in the foothills of West Kameng (26° 58' and 27° 12' N;

[1] Referred to as the Survey in the following pages-

PLATES 1-2



1



2

Warangal Fort : 1, view of the excavated trenches and exposed sikhara of southern sub-shrine; 2, lamp stand (copper)



3



4

Warangal Fort : 3, short spouted pot (copper); 4, miniature grey ware vessels

and 92° 7' and 92° 41' E). The area is bounded by the hill ranges of Bomdila and the Rupa on the north and the plains of Assam on the south. To the east, area is delimited by District East Kameng and to the west by Bhutan.

The area is habitated by the people of various Bodic and non-Bodic groups *viz.,* Sherdukpens, the Monpas and the Akas who are non-Bodic. They constitute a great part of the district population. Except the Akas, all others are believed to have migrated from Tibet. But the Akas have no clear memory of the exact place of migration.

The main aim of exploration was to ascertain the archaeological evidence in the area. In the course of investigation remnants of early settlements were discovered at two places, i.e., Bhalukpong and Dimachang New Betali.

Bhalukpong is situated in the lower recess of Aka hill. The Tezpur-Tawang road passes through the site. Though once the site was under deep jungle, today the area is debarred of jungle due to the extension of modern township and the archaeologically important ruins have been destroyed and done away.

Two ancient wells still exist with potable water at the site, though in partly damaged condition. One of these is located to the southeastern direction of the site near Bomdila-Bhalukpong road. No masonry work was found there, presently used with C.G.I. sheets as rings. Other well was made out with bricks and is situated to the western flank of the BRTF (Border Road Task Force) campus. The present depth of the well is 2.17 m. Almost all the inner courses of bricks are found intact. The well measures 5.84 m in circumference.

A rectangular pond still exists to the south-eastern direction of the brick well. The pond measures 68 m east-west and 51 m north-south.

Large number of bricks and stone remnants are scattered all over the site. All the stone blocks/slabs are carved out from sandstone and vary in size. The surface of the bricks are not well polished and limited number of bricks have carvings. Some of the blocks are badly weathered.

The trial-excavation revealed a number of sand stone slabs/blocks along with potsherds. A *linga*-type stone has been recovered near a big stone-slab. The slab was elegantly shaped to spout the liquid. Possibly the slab was used to discharge the liquid substance, which was poured over the *linga.* The findings suggest that the people of this place practiced Saivite faith in the medieval times.

Dimachang Betali ruins are located in the hills of Rowta Forest Range about 30 km west from Bhalukpong. The site is bounded by the Betali stream to the east and the river Dimachang from the west. The foot-track connecting Baha-Pum and New Betali village runs to the north and low hill ranges to the south.

A few low retaining walls, a muller stone, which measures 54 m in length and 41 m in breadth, were found there. A few meters away, a stone basin was located which is well grinded. The rectangular

container contains four holes on its four upper corners. Outside the container, the *Mahayana* Buddhist *mantra 'Om mane peme hum', 'Om Bajra Guru peme Chije hum Shri* is inscribed. A heap of stone and brick debris was found about 200 m south-east of former ruins. Among the dressed stone blocks, a turret shaped, well decorated stone block was found which might have been used on the pinnacle of building. The shape and size of the bricks have resemblance with the medieval bricks of the Brahmaputra Valley.

Besides these, a rock inscription was found on the left bank of Betali stream, about 1.5 km south-east of the main archaeological site. The script of the inscription is in Tibetan. On the rock 'Om *mane peme hum'* is inscribed. The findings revealed that sometimes in the medieval period some group settled there which believed in *Mahayana* Buddhism.

ASSAM

3. Excavation at Suryapahar, District Goalpara

J. Das of Guwahati Circle of the Survey, assisted by P.M. Das and T.K. Srivastava resumed excavation at the site in continuation of earlier work *{Indian Archaeology 1995-96 - A Review,* pp. 3-4). [1]

Excavation was confined to the southern area of the mound which has brought to light several ancient brick walls, brick paved pathways and southern enclosure wall of the temple-complex. The walls are made of burnt bricks with mud-mortar. The enclosure walls of the complex run in cardinal directions connected with each other at right angles.

Among the antiquities found, terracotta figurine, decorative bricks and terracotta plaques of both geometrical and floral designs are noteworthy.

Trenches have been laid around the recently exposed stone temple basement on the southern embankment of the tank. Excavation has brought to light the remains of rectangular brick compound walls on the east-west and southern sides respectively. The southern side wall measures 45-30 m in length and the exposed western wall measures 18 m and in the centre of this wall doorsill is exposed which indicates a gateway.

The site is badly disturbed due to human vandalism. Near the recently discovered temple basement, three more badly mutilated subsidiary shrines have been found along with brick paved pathway, edges of which are strengthened by roughly dressed stone slabs.

The stone temple basement is situated on the north-east corner of the temple-complex. The superstructure of the temple is lost and the basement is survived upto the plinth level having the plan of *pancharatha* order. On the northern side of the basement *apranala* has been provided with a head of a *makara.* The stone components of the basement are highly decorated. On stylistic ground the temple is datable to eighth-ninth century AD.

Later modifications were made by enlarging the small, original temple enclosed by random rubble masonry wall but the superstructure of the later phase construction is missing.

[1] This publication is referred to in the following pages by the year only.

Among the antiquities mention may be made of terracotta objects with floral designs, animal figurines, decorative bricks, etc., which seem to be the remains of an earlier Surya temple. The ceiling slab with twelve Aditya figures is kept near the site and is presently under worship.

On the way to Jaina Cave on the eastern side of the Suryapahar hill, excavation brought to light the structural remains of a water *kunda* which is made of dressed stone blocks. The *kunda* is badly disturbed. Excavation has also yielded a few coping stone blocks along with the floor and side walls made of finely dressed stone slabs mainly of granite rocks.

4. Excavation at Duboroni, Borpathar, District Golaghat

Deepirekha Kauli and H.N. Dutta, of the Directorate of Archaeology, Assam, under the direction of G.N. Bhuyan excavated the site Duboroni which is situated on the right bank of Dhansiri, a southern tributary of the Brahmaputra. One of the old streams of Dhansiri, now in the form of a swamp, is closed to the western proximity of the site. This site lies at a distance of 15 km from Sarupathar, the Sub-Divisional Headquarters of the Dhansiri Sub-Division.

Exploratory field work at Duboroni indicates that the habitation once extended beyond its present site of excavatioa This can be noted from the existing evidence of an old ditch joining Dhansiri laid towards the south-west of Duboroni. Signs of habitation found at Duboroni cover an area of about 4 sq km. It is probable that in ancient times these settlements formed one continuous unit. The main habitation today, is however, confined to the northern and eastern parts of the mound excavated and surrounded by reinforced ramparts and ditches.

Evidences found in Duboroni are brick-bats, stone sculptures of Vishnu, Siva, Daksha, Arddhanarisvara, Varahi, *Manusha-linga,* and Siva-*linga,* besides carvings of stone *sankha,* figure of devotee, wooden Vishnu figure and a number of *templepranalas* which often are reported from brick remains. A Brahmi inscription (44 x 23 x 8.8 cm) was recovered from the site.

To know the cultural sequence of the site and details of structural remains exposed in 1993-94, Trenches BPD III and BPDIV, each measuring 7 m x 7 m were laid to cover the entire mound (pl. 5).

The top of the central brick structure which is a platform (pl. 6), was found laid in north-south and east-west directions measuring 1.40 m and 1.25 m respectively. This central platform was found with an elongated stone sculpture to be an *ekamukha-linga.*

Subsequent digging gradually led to the partial exposure of the outer wall in north-west corner of the trench, laid in east-west direction. It was found to be 1.70 m in length, 0.60 m in width and 0.28 m in height. In the eastern part of the trench, another brick structure was exposed measuring 6.65 m in length, 0.60 m in width and 0.28 m in height.

Further digging in this section led to the exposure of another brick alignment in east-west direction at the middle part at a distance of 1 m from *garbhagriha* which continued by taking a turn from its easternmost point towards south. This structure is an extension of the central

PLATES 5-6



5



6

Duboroni : 5, general view of the site; 6, view of excavated remains

structure mentioned above. Exposure of the centrally laid structure with an *ekamukha-linga* helped considerably to determine the character of the architectural plan, which appeared to be a ground plan of a squarish temple provided with a *pradakshinapatha* and a *garbhagriha.* The space in-between the central structure and the middle structure was found with displaced brick-bats and dark sandy soil. After removal of these it was found to be paved with bricks at a depth of 2.05 m and measuring 1 m wide on the east-west and 1 m wide on the north-south *of tins garbhagriha.* The height of the wall surrounding the complex was 1 m and the central structure was 0.75 m. On the floor two post-holes measuring 0.25 m and 0.21 m in diametre were found.

Vertical digging was taken up in Trench BPDIV. It exposed the middle structure measuring 5.23 m in east-west alignment and the outer alignment of the structure measured 10.40 m in length and 60 m in width.

The inter-distance between the platform and the surrounding inner brick wall was 1 m facing south, 1.20 m facing east, 0.85 m facing north and 0.75 m facing west and the distance of the outer wall from the middle wall was 2.75 m facing south, 3.25 m facing east, 2.85 m facing west, 3 m facing north. The space between the outer wall and the middle wall served probably as *a pradakshinapatha* of the temple. The platform was found to be almost square in its layout. It is 1.40 m in east-west. The height was found to be 0.85m. The hole of the *garbhagriha,* at the centre of the structure in which the *ekamukha-linga* was installed, was rectangular measuring 0.25 x 0.52 m. The depth of the hole was 0.21 m.

The outermost wall comprises wall facing north 7.40 m, wall facing south 10.80 m, wall facing east 6.40 m and wall facing west 12.10 m. The central structure comprised wall facing north 3.65 m, wall facing south 5.40 m, wall facing east 4.45 m and wall facing west 3.00 m.

The only antiquity found in course of excavation, as stated, was the *ekamukha-linga,* at BPD-III in locus 0.65 x 0.30-1.20 m in the third stratum of the stratigraphical context, at the central platform. The *mukha-linga* was found lying facing eastward. The badly weathered face of Siva in this *linga* is carved in low relief.

From Duboroni a figure of Siva and *manusha-linga,* and from Rajapukhuri in Sarupathar an *ekamukha-linga* were found. The figure of Siva and *Siva-linga,* together with the one datable to *c.* 700 AD, found in course of excavation give clear indication of the development of Saivism as a prominent religion in Duboroni during the early medieval period. The *ekamukha-linga* confirms that excavated brick-built temple was dedicated to lord Siva.

It would not be out of place to mention that a one-line stone inscription with a sign of *trisula,* found in the beginning of the inscription, perhaps engraved as an auspicious sign of invocation was collected from Duboroni approximately at a distance of 2 km in the north-west of the excavated site. This inscription measures 44 x 23 x 8.8 cm Palaeographically the characters of this inscription are found to be similar to that of the Nagajori Khanikar Gaon fragmentary stone inscription at Sarupathar, engraved in north Indian Brahmi and datable to AD 400-

500. The study revealed that the present inscription records the name of Sri Vasundharavarman which implies that Sri Vas jndharavarman was a Saiva and perhaps was a king of this region, ruling during AD 400-500.

The available material unearthed in course of excavation at Duboroni revealed the existence of a brick built Siva temple at the site under single roof, squarish in plan and elevation with a *mukha-linga* in its central sanctum or platform. Evidence of a square platform surrounded by another squarish brick wall, and the brick floor laid in-between these two structures indicate that the temple architecture at Duboroni consists of a *garbhagriha* circumscribed by a *pradakshinapatha* laid in squarish plan. Evidence of holes at brick floor indicates that a number of wooden posts were used possibly to raise a roof over the structure.

5. Excavation at Ambari, District Guwahati

Excavation at Ambari (fig. 1) on the southern bank of the Brahmaputra near Guwahati railway station was resumed by G.N. Bhuyan of the Directorate of Archaeology, Assam, assisted by Deepirekha Kauli, and H.N. Dutta.

Lower deposits of the site were exposed which were not unearthed during 1992 season by the Guwahati University.

The digging was carried out upto the layer (6) in AMBIIE (fig. 2). A sanctum in the form of a well or bath surrounded by a squarish brick structure for securing holy water was exposed. It was laid in square plan (pl. 7). From this square brick sanctum or the well a brick pathway of 1 to 1.20 m in width was found running towards south and north direction (pl. 8). Continuation of this pathway was noticed in AMB II E. In AMB II E this pathway was found laid over another brick structure laid in east-west direction. This pathway, laid in a curvilinear plan, has two steps along its both edges laid in two alignments of vertical bricks. A vertical brick alignment of similar nature was also found at its middle. Seven number of postholes were exposed. Of these five were laid in the brick floor.

Trench AMB II E exposed altogether six different layers of bricks belonging to six different phases of habitation (pl. 9). Besides these structural evidence, a large number of sherds of both hand-made and wheel-made variety and kaolin wares have been found.

The trial Trench AMB III E (A) exposed the further continuation of the pathway in a curvilinear plan towards the southern direction.

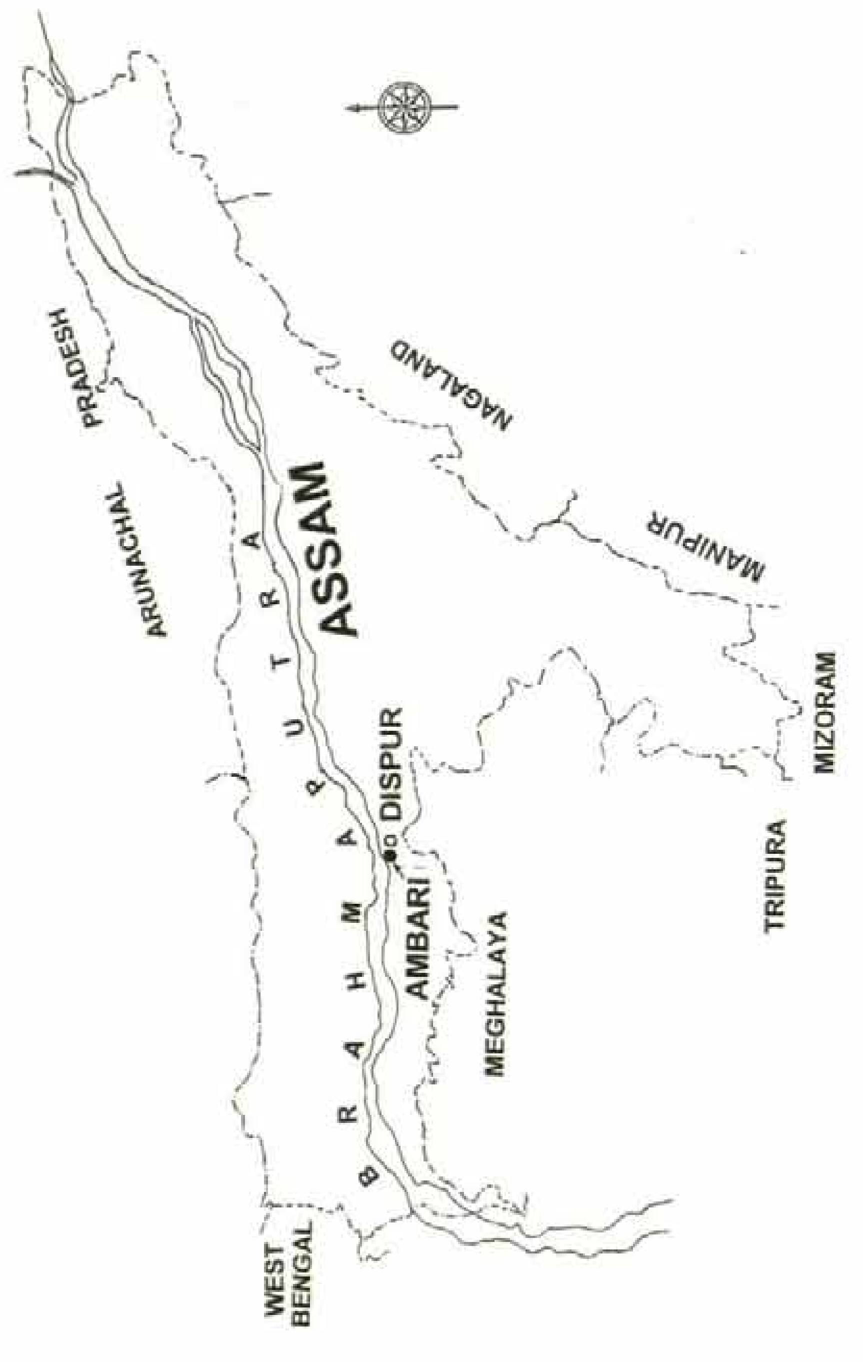
The exposed evidence clearly indicates the development of an urbanised habitational site with at least six stages of building construction of very fine bricks and decorated stone blocks datable to about ninth-tenth century.

6. Exploration in District Karbi Anglong

Dilip K. Medhi of the Department of Anthropology, Guwahati University, Guwahati, located megaliths comprising menhirs, dolmen and dolmenoid menhirs.

At Kamarpha near Tengralangso of Western Karbi Anglong, menhirs are scattered within a

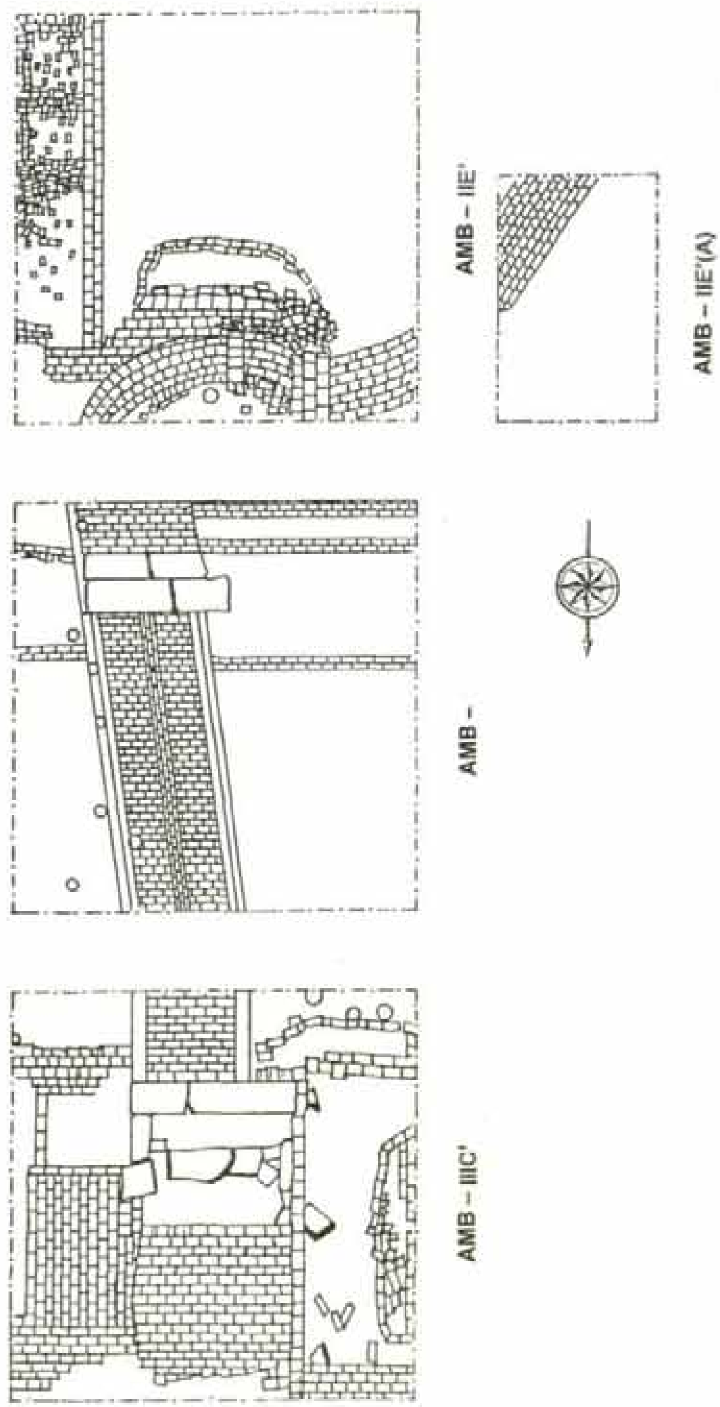
Fig. 1



LOCATION OF AMBARI

Fig. 2

AMBARI, GENERAL STRATIGRAPHY OF THE EXCAVATED TRENCHES



PLATES 7 - 9



7



8



9

Ambari : 7, brick structures; 8, brick pathway; 9, structural remains

stretch of 1 km along the Rajagaon-Bhoksong road. Altogether they are sixty-three in number in dilapidated state present in the household premises of villagers. The largest concentration is of twenty-nine menhirs. The biggest two in a pair measure 141 cm in height, 52 cm in breadth and 20 cm in thickness and 90 cm in height, 88 cm in breadth and 17 cm in thickness each. Local people have great reverence to the pair and worship them every year.

Rongali near the historical Tika village is another prolific megalithic site which lies atop the forested Tika hill. They are in three discernible groups within a stretch of 50 m along the road. It begins with one dolmenoid menhir and three dolmens and two other concentrations give a number of more than hundred menhirs of different shape and size. The biggest menhir measures 2.8 m in height, 80 cm in breadth and 20 cm in thickness. A number of earthen pots and potsherds were found during construction of the road.

Nongjrong, nearly 5 km away from Rongpongbong and about 55 km south-west of Hamren town is a unique megalithic site in entire Western Karbi Anglong. It is a hilly undulated grassy terrain with infrequent tall grass, pine trees and with scattered blocks of rocks. A beautiful huge dolmen measuring 2 m in height rests on three pieces of vertical rocks. Nearly 150 m towards its right, there exists a concentration of twenty dolmenoid menhirs with varying heights of 0.5-2 m. Further down, another four-legged dolmen that tilts nearly 45° measuring 1 m appears on another hillock.

BIHAR

7. Excavation at Kesariya, District East Champaran

Muhammed K.K. of Patna Circle of the Survey assisted by D.P. Sinha, M.K. Dwivedi, S.K. Arora, M.P. Singh and Avinash Kumar took up excavation work at the lofty mound of Kesariya with a view to understand the nature of mound and to expose the expected structure of stupa as reported in the earlier reports of Cunningham for the year *1861-62*. Sixteen trenches measuring 10 x 10 m on the north-east slope of the mound have been opened which have brought to light a terraced circular stupa fully veneered with eight to ten courses of bricks. Three terraces above the ground have been exposed so far showing rows of three cells at a regular interval on each terrace. The gap in-between the rows of cells have been filled up with attractive architectural patterns. The first terrace has a row of niches, the second has star shaped pattern and the third has serrated design to fill up the gap in-between the two rows of cells. The base circle of the stupa rises with a slight curvature leaving offset of 4 cm after every two courses to meet the floor of the first terrace from the ground. The back wall of the cells and niches of the first terrace rise to meet the floor of the second terrace. Similarly back wall of the cells and decorative pattern of the second terrace meet the floor of the third terrace. All the terraces have a circumambulation with a rammed floor of brick jelly and *lime-surkhi* mortar. Moulded and decorative bricks have been used on the outer surface to create a definite pattern or design.

Three phases of construction have been noticed so far. The first phase represents the simple circular terrace filled with earth in the core with a veneering of bricks in eight to ten courses. In second phase, the cells and the polygonal decorative patterns have been added to the circular terraces and the third is a phase of major repairs during the British period.

The floor of the cell has been plastered with lime and *surkhi.* Traces of lime-plaster have been noticed on the wall also at places. All the cells have a central brick platform attached to the back wall for the images. Lower portions of large stucco images of Buddha have been exposed in three cells. One depicts Buddha seated in *dhyana-mudra* and the other two in *bhumisparsha-mudra.* Lumps of images have also been found in some of the cells. All the cells once had images of Buddha on the central platform. Traces of a subsidiary image attached to the side wall and much smaller in size have also been noticed in one cell. Besides the stucco images, a nut-shaped terracotta bead, sherds of vases and bowls in red ware, fragments of huge thick jars and two miniature pots associated with rituals have been recovered from the site.

On the basis of pottery, images and the architectural pattern, the present stupa could be assigned to the seventh century.

8. EXCAVATION AT TARADIH (BODH GAYA), DISTRICT GAYA

Ajit Kumar Prasad assisted by Atul Kumar Verma, R.P. Verma, S. Ranjan, Alok Ranjan and J.P. Yadav resumed excavation at Taradih mound under the general guidance of Mohan Chaudhary of the Directorate of Archaeology, Bihar. The main objective of the present season's excavation was to collect samples from earlier levels for scientific examinations and to spot out the brick built monastic complex of the Pala period to ascertain its extent and to determine their different structural phases. Due to the paucity of time, excavation work had been taken up in a limited area.

Period I was represented by the cultural deposit of the neolithic complex. The pottery was mainly hand-made. It was represented by both burnished and plain red ware. A few cord impressed sherds were also collected. The important types included *handis* with out-turned rim, bowls, miniature pot, etc.

Period II, distinguished by the pottery of the Chalcolithic period in general, revealed wheel-made specimens. Though the hand-made specimen of the previous period still continued but the frequency was less. Besides red ware, black-and-red ware and black ware were also found in good numbers. The important types included vases, *handis,* rimless *handis,* storage-jars, dishes, dish-on-stand, lipped bowls with globular profile and out curved featureless rim, perforated bowls etc. Some pottery pieces contain white paintings in the form of dots, strokes, wavy lines, etc. A few sherds were decorated with parallel lines, cris-cross and diamond designs. The larger pot like storage-jar was decorated with thumb and rope impressed designs. A good number of disc shaped tiny beads of steatite was also discovered.

Period III was represented by iron and black slipped ware. The black-and-red, black ware and

red ware of earlier period continued in this period, much improved in quality. These were made of well levigated cay and were well fired. Only the large pottery pieces show the evidence of use of paddy husks. The main pottery types included deep bowls, *lota-shaped* bowls, *handis,* rimless *handis,* basins, etc. The important antiquities are represented by beads, balls, conical objects. The other important terracotta objects are earlobes, beads besides a few pieces of iron slags.

Period IV was marked by the appearance of NBPW though black-and-red ware still continued but in less frequency. Many new shapes appeared in this period. The important types included vases of out curved thickened rim and out curved rim, dish with sharped carination at the base, bowls with everted rim, bowls with horizontal spread-out rim, basins with beaded rim, lipped basins, lid-cum-bowls, flat based bowls, troughs, etc. The important finds comprised stone beads, terracotta beads, earlobes, dice, gamesman, animal figurines, etc.

Period V was represented by red ware belonging to the Sunga-Kushan period. The important ceramic types included *surahi,* vases, flat based bowls, frying pan, etc. Noteworthy antiquities included beads of stone, glass and terracotta, animal figurines of terracotta and iron objects.

Period VI was marked by the appearance of Gupta and late Gupta antiquities. It included beads, votive stupa, *chhatravali* pedestal of votive stupa, images of Buddha, panels of thousand Buddhas, seal and sealings.

Period VII was distinguished by the antiquities of Pala period. The important finds of the period were represented by seal and sealings of terracotta, beads, gamesman and conical objects of terracotta, votive stupa, *chhatravalis* and panels of thousand Buddhas.

9. Excavation at Kolhua, District Muzaffarpur

In continuation of the previous year's work *(1996-97,* pp. 5-6), Patna Circle of the Survey, carried out excavation at Kolhua, under the direction of Muhammed K.K., assisted by D.P. Sinha, Manoj Dwivedi, Avinash Kumar and M.P. Singh towards west and north of the tank. Excavations have exposed the remains of three votive stupas and a rammed floor with a slope towards the tank.

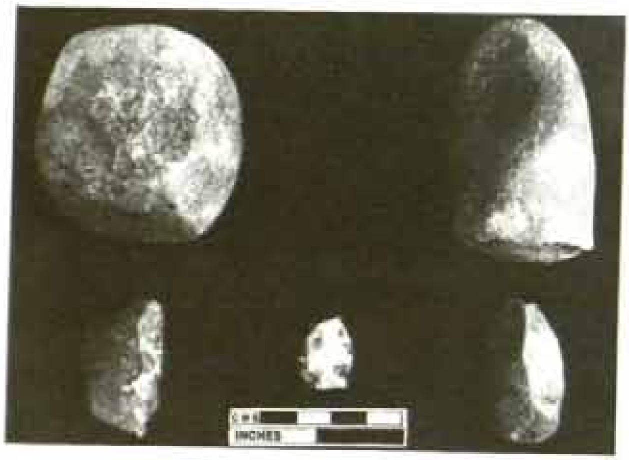
A small area of 10 x 40 m has also been taken up towards north-east of the Asokan pillar which has revealed 1.40 m thick walls, cells with entrance, some red ware potsherds, terracotta balls and two nut-shaped beads, indicating the existence of another monastery.

10. Excavation at Maner, District Patna

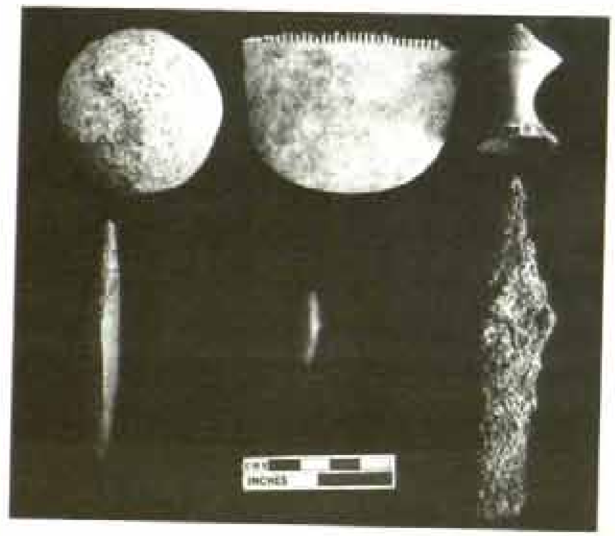
The Department of Ancient Indian History and Archaeology, Patna University, in continuation of the earlier work *(1996-97,* pp. 6-8), resumed excavation at Maner, directed by A.K. Singh under the overall supervision of B.P. Roy, N.K. Arya and P.K. Bose.

The main objective of this year's excavation was to trace the extent of the Neolithic cultural phase which was earlier discovered in an area close to the northern end of the mound during the year 1989-90. Keeping

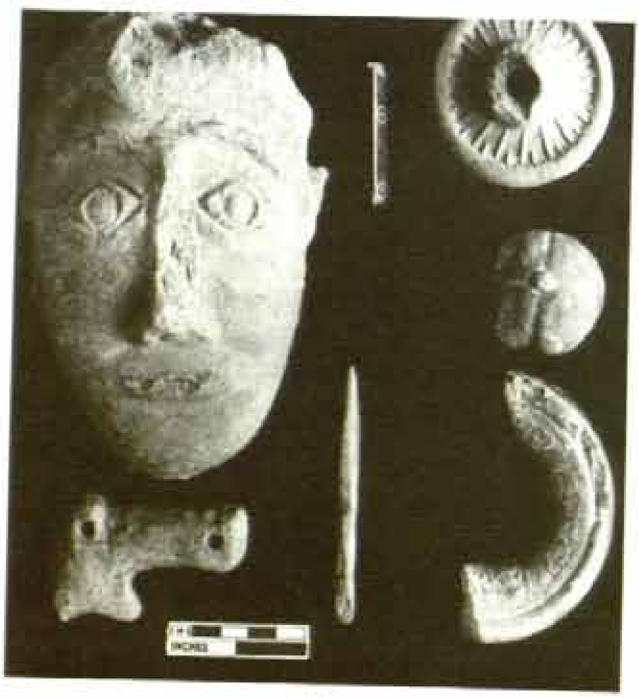
PLATES 10-12



10



11



12

Maner : 10, *stone artifacts;* 11, *miscellaneous antiquities of stone, terracotta, iron and bone;* 12, *terracotta, stone, bone and ivory objects*

in view this objective, two trenches each measuring 6 *x* 4 m were laid out towards the southeastern side of the mound. The trenches laid out in east-west orientation were christened as MNR - 7 A and MNR - 7B.

Excavation in this area revealed three cultural periods against the five noted in earlier excavations. Period I belonging to the pre-NBP Ware cultural phase of chalcolithic vintage is represented by a thin deposit of yellowish soil (layer- 8) with an average thickness around 0.70 m overlying the natural soil. The above layer has yielded black-and-red ware, black ware and red ware comprising both plain and finely slipped specimens. The antiquities obtained from this layer include stone bladelet, blade-core, flake blade, bone object and stone hammers (pl. 10).

Period II of this site belongs to the NBPW phase and it is represented by three layers from 7 to 5 and the thickness of entire deposit is around 2.70 m. The lower most layer 7 is characterised by deep yellowish soil showing black and brown patches. The pottery obtained from these layers show the usual NBPW types and other associated wares like black-slipped ware, grey ware and black-and-red ware. The antiquities ascribed to this period include iron spear-head, terracotta earlobe, bone points, stone and terracotta sling-ball and terracotta human leg (pl. 11).

Period III belonging to the Gupta phase is represented by two layers from 4 to 3 with an average thickness around 0.40 m and 0.20 m respectively. The antiquities associated with this period include stone bangle, ivory dice, stone weight, terracotta bird figurine, terracotta human head, iron slag and terracotta and stone balls (pl. 12).

The uppermost deposit, represented by layers 2 and 1, has yielded mixed materials of different kinds including some fragments of green glazed ware of medieval period. The layer 1 is represented by humus with an average thickness around 0.20 m.

11. Excavation at Ramchaura, Hajipur, District Vaishali

K.P.Jayaswal Research Institute, Patna, resumed excavation work at Ramchaura, under the joint directions of Jagdishwar Pandey, CP.Sinha, Bijoy Kumar Choudhary, Anil Kumar with the assistance of S.NJha, B.K.Jha, Aditya Chatterjee, Arun Kumar and Vinoy Kumar of the Institute took keen interest and participated in the excavation work.

The work was mainly undertaken to ascertain the cultural sequence in the south of the Ramchaura Temple. Trench (RCH-4) measuring 10 x 5 m was laid with its orientation in north-east and south west. Digging at the site revealed cultural deposit divisible into four cultural periods.

Period I is represented by the Chalcolithic deposit having an average thickness of 1.20 m. The lowermost deposit of layer(9) which rests above the natural compact red clay, revealed sherds of red and black-and-red ware. The shapes include dishes, bowls, trough and spouts. No stone object could be noticed in the Chalcolithic phase during this year's excavation. A terracotta head and a stopper was also recovered.

Period II is marked by the pre-NBPW phase represented in layers (7) and (8). Layer (8) is composed of brown soil and its average thickness is around 0.70m. The layer (7) consists of blackish brown soil and has a thickness of 0.57m. The pottery obtained from this layer include black-slipped, grey and red wares. The shapes in black-slipped ware include dishes and bowls. The antiquities include terracotta balls, beads and a wheel.

Period III is represented by the NBPW deposit with a thickness of 1.50 m in layer(6). It is composed of thick brown soil with black patches. The pottery of the period is represented by the NBPW, red ware, grey ware and black ware. The shapes in these wares include bowls, dishes, basin, rimless pans with handle etc. The antiquities associated with this period comprise terracotta animal figurines, beads, balls, stoppers, wheels; a carnelian bead; a broken shell bangle; stone pestles and a few iron objects.

Period IV which belongs to the Sunga-Kushan phase, is represented by layers (4) and (5). The layer (5) is composed of yellowish brown soil and its average thickness is about 1.50 m. The layer (4) is made of brown soil with an average thickness of about 0.40 m. The ceramics discovered from these layers include dishes, bowls, miniature bowls, pots and vases. The antiquities associated with this horizon include terracotta human and animal figurines, beads, balls, wheels, stopper besides a glass bangle and iron objects.

Layers (3A) and (3) with a sandy deposit of 0.20 m and 1.30 m revealed only a few potsherds and antiquities but nothing so significant.

The layer (2) and (1) also yielded mixed materials of different types comprising potsherds, terracotta and iron objects.

12. Excavation at St. Augustine Church Complex, Old Goa

In continuation of the previous year's work (*1996-97,* pp. 9-11), excavation at St. Augustine Church at old Goa, carried out by the Mini Circle, Goa, of the Survey, under the guidence of J.V.P. Rao, assisted by Manoj Kumar Saxena and Gopal Rao.

During this year's scientific clearance of debris measuring about 24 m in length, 6 m wide and 4 m thick and unearthed five extant pillar bases of cloister. The pillars were built of laterite blocks with lime mortar and plaster. Out of five, three pillars are at western side, one at southern side. The extant base measures 1.50 x 1.50 m, while the extant pillar base at south-west corner measures 2.25 x 1.75 m. The extant height of the pillars range from 1.25 to 1.75 m. A door counter to that of the one leading into cloister also was unearthed on the south-west corner of the cloister which in turn leading to the inner parts of the convent. It measures 2.05 m at threshold and 2.50 m in height. This season's excavation could expose the whole plan of the cloister measuring 34.4 x 26.95 m consisting of

seven pillars length-wise i.e., east-west and five width-wise. The site requires further excavation to clear the collapsed debris to unearth the buildings like Convent, Library, Seminary, number of cells, etc. of the Church of St. Augustine. The excavation yielded the fragments of Chinese ceramics, tiles and a circular stone with a central hole.

GUJARAT

13. Exploration in District Godhra

In the course of village-to-village survey in Halol taluk, Vilas D. Jadhav of the Vadodara Circle of the Survey, discovered the following sites of archaeological importance.

Village/Site	*Nature of remains*
Kansara	Step-well of medieval period
RayanKhand	Hero-stones depicting male figure, holding sword and shield without any inscription and step-well of nineteenth century
Shivarajpur	Step-well of medieval period
Talavadi	Hero-stones depicting male figure holding sword and shield of nineteenth century
Tapalavav	Stone sculptures of Ganesa - Parvati and four hero-stones of medieval period, L - shaped underground chamber made of dressed-stones having small Siva-linga, of medieval period

14. Excavation at **Dholavira, District** Kachchh

With a view to exposing the extent of the rock-cut reservoir, gathering more details of planning and architecture, determining precise architecture, date and nature of the tumulus in the cemetery and carrying out conservation of the principal structures of Castle, the Excavation Branch V, Vadodara and a team from the Directorate of the Survey, resumed excavation at Dholavira under the direction of R.S.Bisht who was assisted by R.S.Fonia, Y.S.Rawat, Bhuvan Vikram, V.H.Parmar,N.B.Soni, Ravinder Kumar, Baldev Singh, K.R. Malviya, Sanjay Kumar, Subhash Chand and D.P. Modi.

The rock-cut reservoir was exposed for 3 m more for its width in a trench that was 12 m long along the north-south axis (pl. 13). All the features of the reservoir mentioned earlier were reconfirmed. The digging was carried down to the bottom. Its masonry work done in

PLATES 13-14



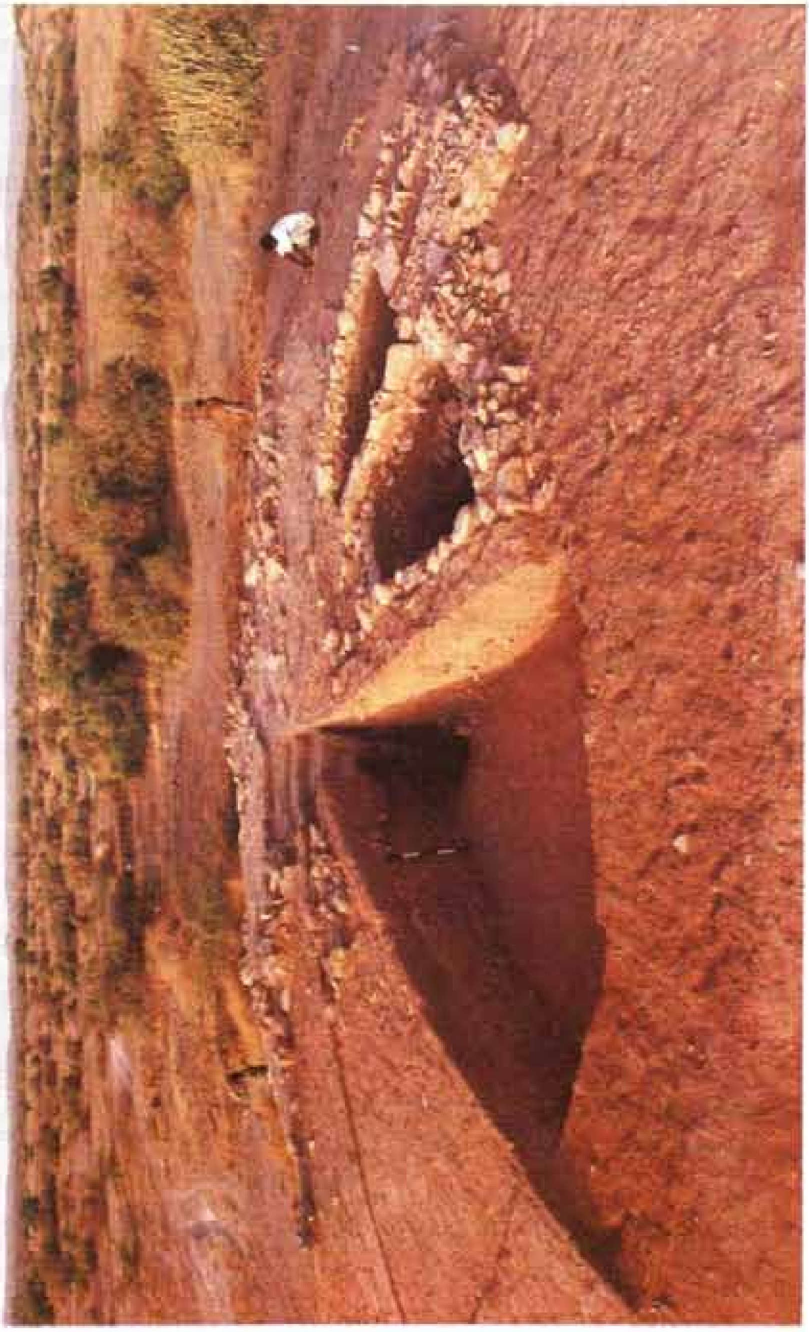
13



14

Dholavira : 13, *rock-cut reservoir with excavated remains to the south of Castle;* 14, *partially exposed masonry reservoir with a flight of steps to the east of Castle*

PLATE 15



Dholavira : partially excavated hemispherical tumulus in the cemetery

the weaker veins of the geological formation was found duly continuing further eastward. The eastern and the western ends of the reservoir still remained to be ascertained. A large number of semi-precious stone beads in almost mint condition as well as two complete dishes-on-stand in addition to the pottery and other objects of the early, mature and late Harappan phases were recovered form the dig.

Significantly, in the open field to the east of Castle, another huge reservoir, a corner— northeastern one partially unearthed in the previous year, has been exposed for a considerable width in a narrow east-west trench (pl. 14). In that strip, it was evacuated to the bedrock which was struck at the depth of about 7.5 to 8.0 m below the level plain. Interestingly, it turned out to be a masonry reservoir of good stonework. Its northern wall was found to be abutted with a flight of thirty steps descending from west to east although its embankment wall on the west remains to be unearthed as yet. Likewise, the width of the stairway is also to be determined finally. Particularly, the upper steps have been found damaged. The northern side wall and the partially exposed eastern embankment wall of the reservoir are extant for more than 7 m in height.

To the south-west of the well, the excavation brought to light the structures of Stage VI. Four copper bangles were also collected from the area.

A segment of the tumulus, circular in plan and hemispherical in elevation, was subjected to excavation although its surface had been cleaned previously (pl. 15). The limited excavation revealed that a circular platform made of bricks with white or pink plaster on the outer face of the structure was cons ructed first. Over that a structure consisting of radial wall running towards the centre and the intervening spaces being filled up with earth' nixed with some stones was raised. That is how a hemispherical structure got a shape. In the central portion, pits of atleast three generations were cut at different times - to what purpose that is not yet clear. However, operation remained inconclusive.

Besides, the excavation was conducted at several places at the site in order to consolidate the previous work and make it more logical. The usual pottery and other objects of different stages of the site were duly collected from the excavation.

15. Exploration in District Kachchh

In the course of exploration, Y.S. Rawat of the Excavation Branch V, Vadodara, of the Survey, under the supervision of R.S. Fonia, discovered a Harappan site at Rapar. The ancient settlement which lies buried under the present town has yielded a few potsherds and bone pieces. A few rubble walls have also been noticed in the deep foundation trenches dug up for construction of modern building.

16. Excavation at Bagasra, District Rajkot

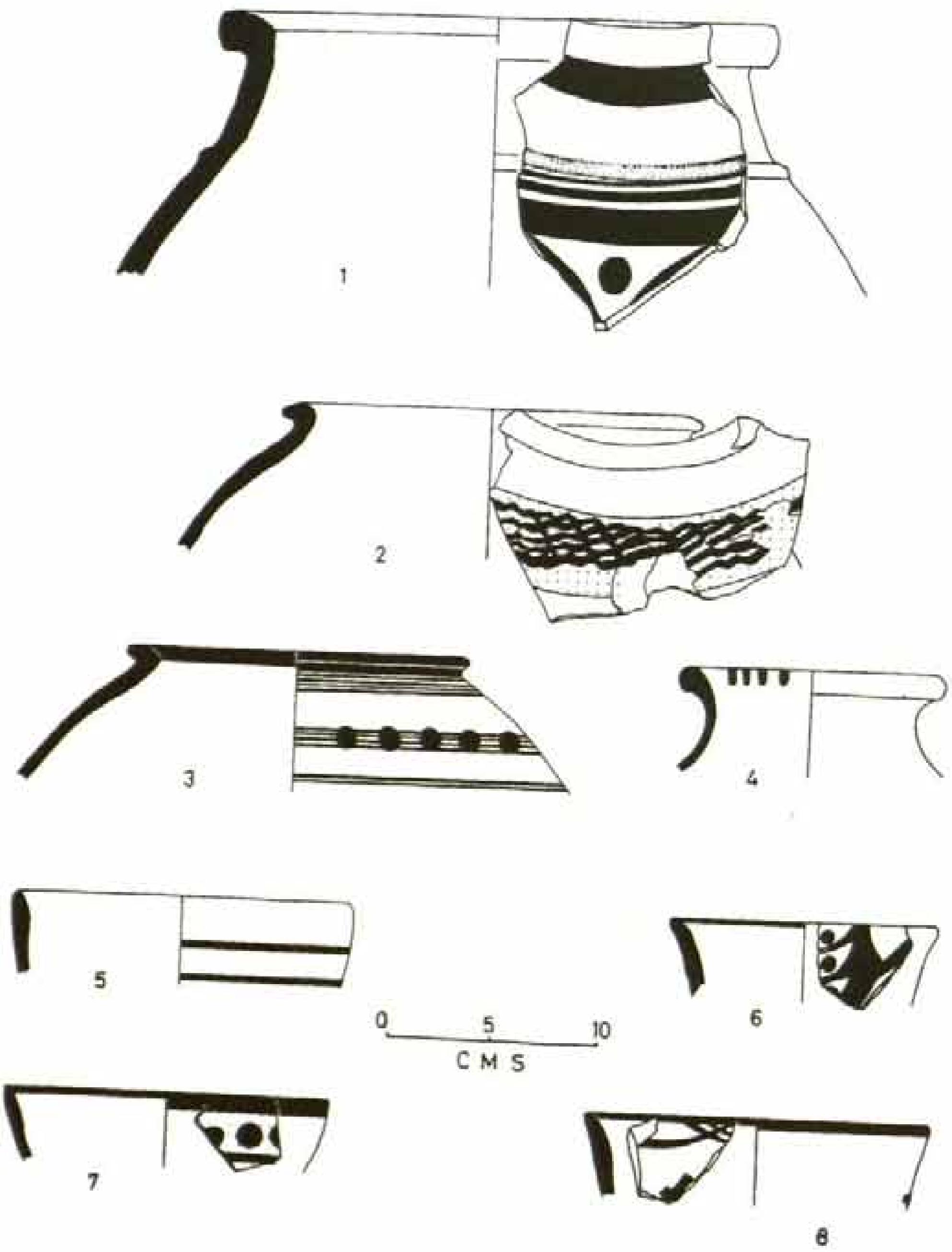
In continuation of the last two field season's excavations *(1995-96,* pp. 16-22; *1996-97,* pp. 19-27), the Department of Archaeology and Ancient History, M.S. University of Baroda, resumed excavation at Bagasra in the current field-season under the direction of V.H. Sonawane assisted by P. Ajithprasad, K.K. Bhan, S. Pratapachandran and

Abhijit Majumdar. The excavations in the northeastern part of the mound during the last two field-seasons have revealed a 5.50 m thick cultural deposit belonging to the Urban/Mature Harappan period, but showing three distinct phases in the cultural development. It also revealed remains of a large, about 5.20 m thick, fortification wall built of stone and mud-bricks. The main aim of the excavation, therefore, was to trace the southward extension of the fortification wall, establish its relationship with the structures exposed in the Trench E q3 in the first season and to expose working areas of shell and faience industries at the site. It was also decided to cut a deep trench in the highest part of the mound with a view to checking the stratigraphic sequence established from the trenches in the northern part of the site.

Seven new trenches each measuring 5 x 5 m were opened up in the southern side at the highest part of the mound. Among these, deep digging was carried out in the Trench Eq3 which extends towards a steep slope at the eastern side from the highest part of the site. This trench revealed a total cultural deposit of 7.75 m incorporating a hitherto unnoticed post-Urban phase (phase IV) in the cultural history of the site. The post-Urban assemblage is represented by about 2.00 to 2.85 m thick deposit in the Trench Er 13 and adjoining areas. Moreover, this assemblage is confined to the southern side of the mound, that too lying outside the fortification wall of the Urban phase. The post-Urban phase is characterised by a ceramic assemblage which resembles the pottery reported from Period-IIB and Period-IIC of the Rangpur sequences (figs. 3-4). The finding includes straight and concave sided bowls with blunt carination and internally bevelled rim, pot or jars with slightly elongated neck and beaded rim, dish with a thick, rounded or drooping rim and small lamps with sharply inturned rim in red ware and buff ware. A few stud-handled bowls with elongated handle in red ware and bowls of black-and-red ware are also reported from this assemblage. The red ware, in fact, is the most abundant pottery of this assemblage. The vessels, especially the bowls and pots, are decorated with simple geometric designs comprising horizontal bands, oblique lines, hanging loops, etc. Some of the straight sided bowls are also decorated with black dots in a light cream background. Lapidary beads of semiprecious stones and faience, shell bangles and inlays, steatite seal and terracotta sealings, which are abundant in the preceding Urban phase are conspicuous by their almost complete absence in the post-Urban deposit. However, a few copper implements including a large knife blade and a heavy chisel/rod are found from this deposit. This last stage in the cultural development at the site is designated as phase IV.

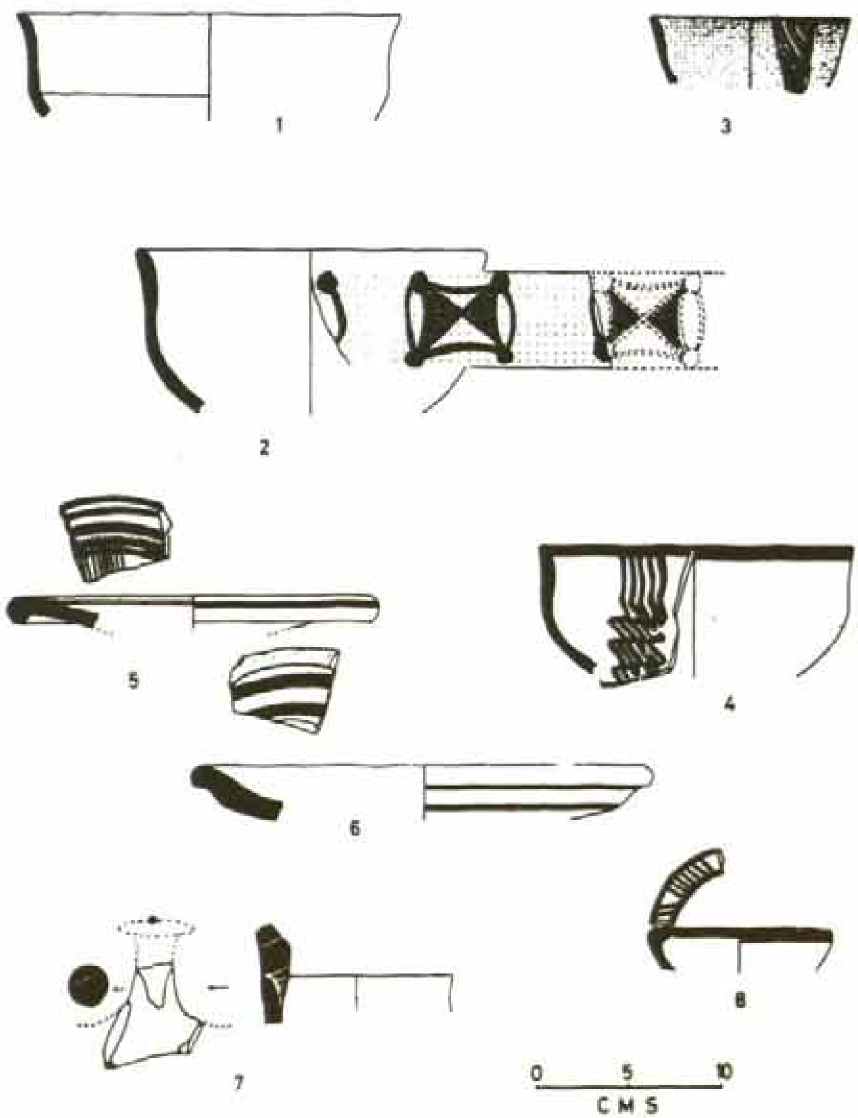
Phase III, representing the terminal stage of the Urban Harappan occupation at the site is characterised by about 0.70 m thick deposit lying directly below the post-Urban phase in the Trench Er 13. Represented by the layers 6 and 7, this phase incorporates several Urban Harappan ceramics including the classical Harappan shapes and decoration. A few sherds of the Reserved Slip Ware and several "Sorath Harappan" vessels such

Fig. 3



Bagasra : pottery from Phase IV — 1, 2, 4 - 8, *red ware* & 3, *buff ware*

Fig. 4



Bagasra : pottery from phase IV—1, 2, 4 - 8, *red ware;* 3, *black-and-red ware &* 7, *stud-handled bowl*

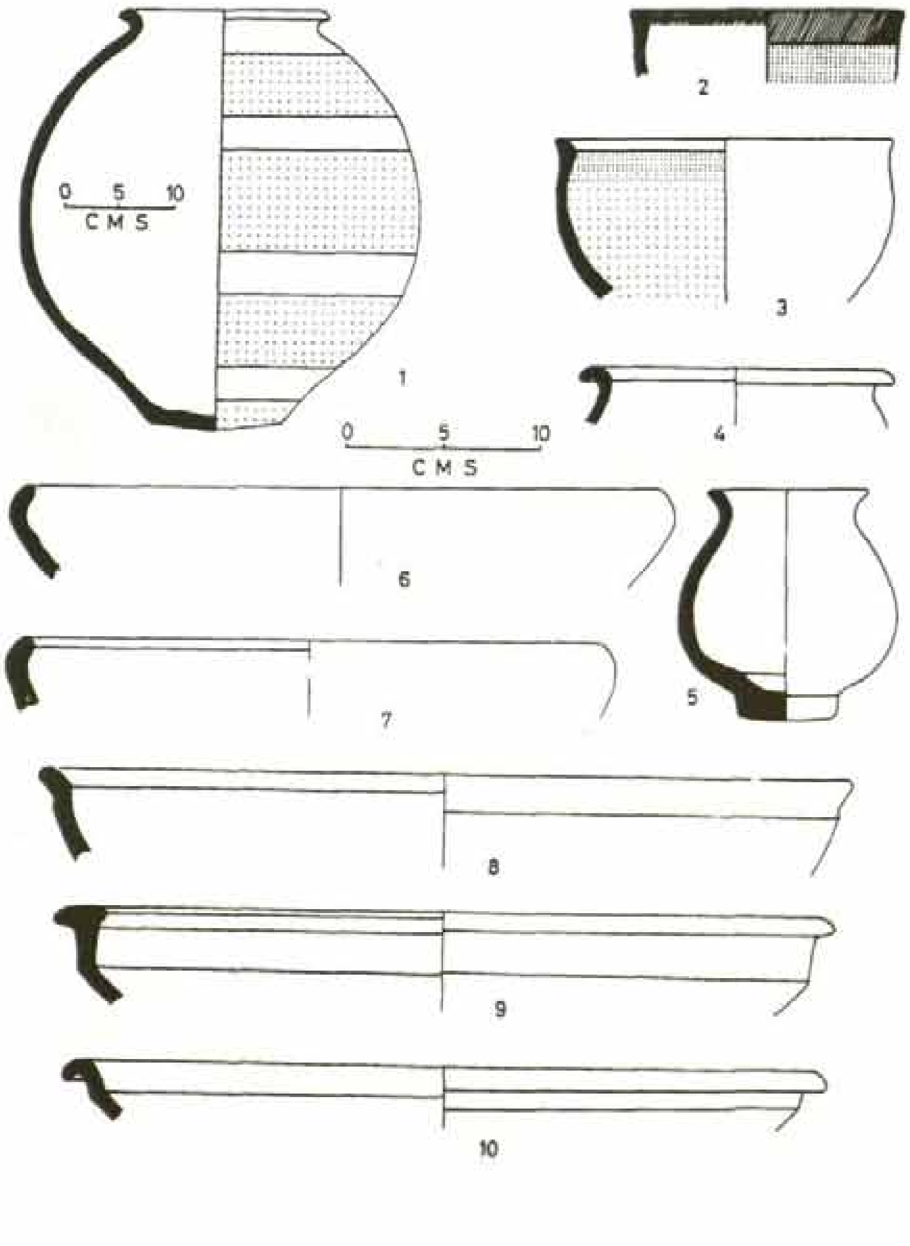
as convex as well as straight sided bowls and large pots are also reported from this phase. A third category of pottery found in this phase is the "Anarta Pottery" of north Gujarat. In addition to the pottery, typical Urban Harappan lapidary stone beads, shell bangles bearing chevron marks, long blades of Rohri chert etc., are also found from this deposit.

All the above mentioned artefacts are also found in the preceding phase II which is represented by the layers 8 to 12 having a total thickness of about 2.40 m in the Trench Er 13. However, it is devoid of the "Sorath Harappan" pottery. This was the most prosperous phase in the developmental history of the site and it showed evidence of extensive structural activity including the construction of a massive fortification wall for the first time. Moreover, the height of the fortification wall was increased on two or three occasions in this phase. Several sherds of black-slipped jar recovered from this deposit are a sure index for the overseas contact of the Harappans during this phase.

The phase I belonging to the earliest habitation at the site is represented by the layers 13 to 17 in the Trench Erl3. The maximum thickness of habitation in this phase is about 1.85 m. The earliest habitation-debris of this phase is lying directly over a natural sedimentary formation of indurated coarse gravel and sand. Although the phase I deposit predates the fortification wall, it incorporates several Urban/Mature Harappan relics. In addition to the classical Harappan ceramics, the deposit included several sherds of the "Anarta pottery" and a distinct group of local pottery (figs.5-6). A distinct red ware with a buff/cream and plum red bichrome slip and another red ware showing drab red slip and indifferent firing are the important types in the local pottery. Remains of brick structures, including a small portion of a 1.35 m high wall, found in the layers 15 and 14 may indicate that the use of mud-bricks for structural construction at the site may have started right from the earliest phase of habitation itself.

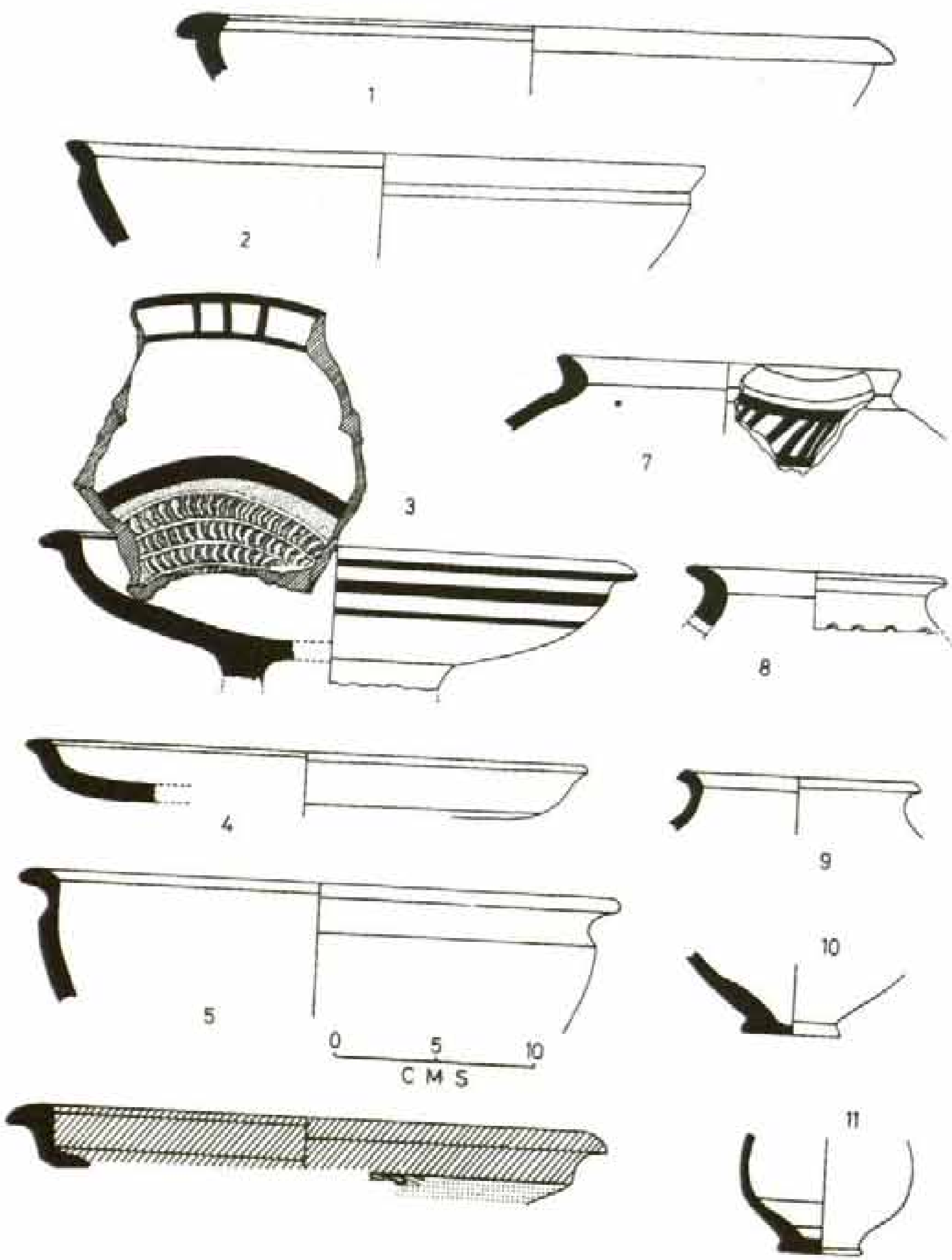
Excavations in the Trenches Eq2, Eq6, Eq8, El 15 and El 16 have not only revealed southeastern corner of the periphery/fortification wall but also its extension towards the eastern and southern side (fig. 7). As has been reported from the northeastern corner in the last season, the southeastern corner also revealed an internal square bastion projecting about 3.80 m from both sides. It is clear now from the excavation that the eastern side of the fortification wall is 65.17 m long and it has an approximate thickness of about 5.00 to 5.20 m at its extant top. It is also evident that the fortification wall was constructed in three stages; the last two stages of which were carried out with a view to increasing its height. Mud-bricks of different colour, composition and consistency were used in the construction of the wall. While the bricks generally followed 1:2:4 ratio, their actual size varied considerably from 8 x 16 x 32 cm to 12 x 24 x 48 cm. The bricks used in the last stage of construction of wall are generally larger in size and were made of coarser material than the penultimate stage. Besides, no mortar was used in the last stage while the earlier stage shows thick and prominent use of light coloured clay mortar. In addition to these, about 1.00 m thick stone bracing

Fig. 5



Bagasra : pottery from phase I — 1 - 3, red ware (bichrome); 4, 5, 10, red ware; 6 - 8, gritty red ware & 9, buff ware

Fig. 6

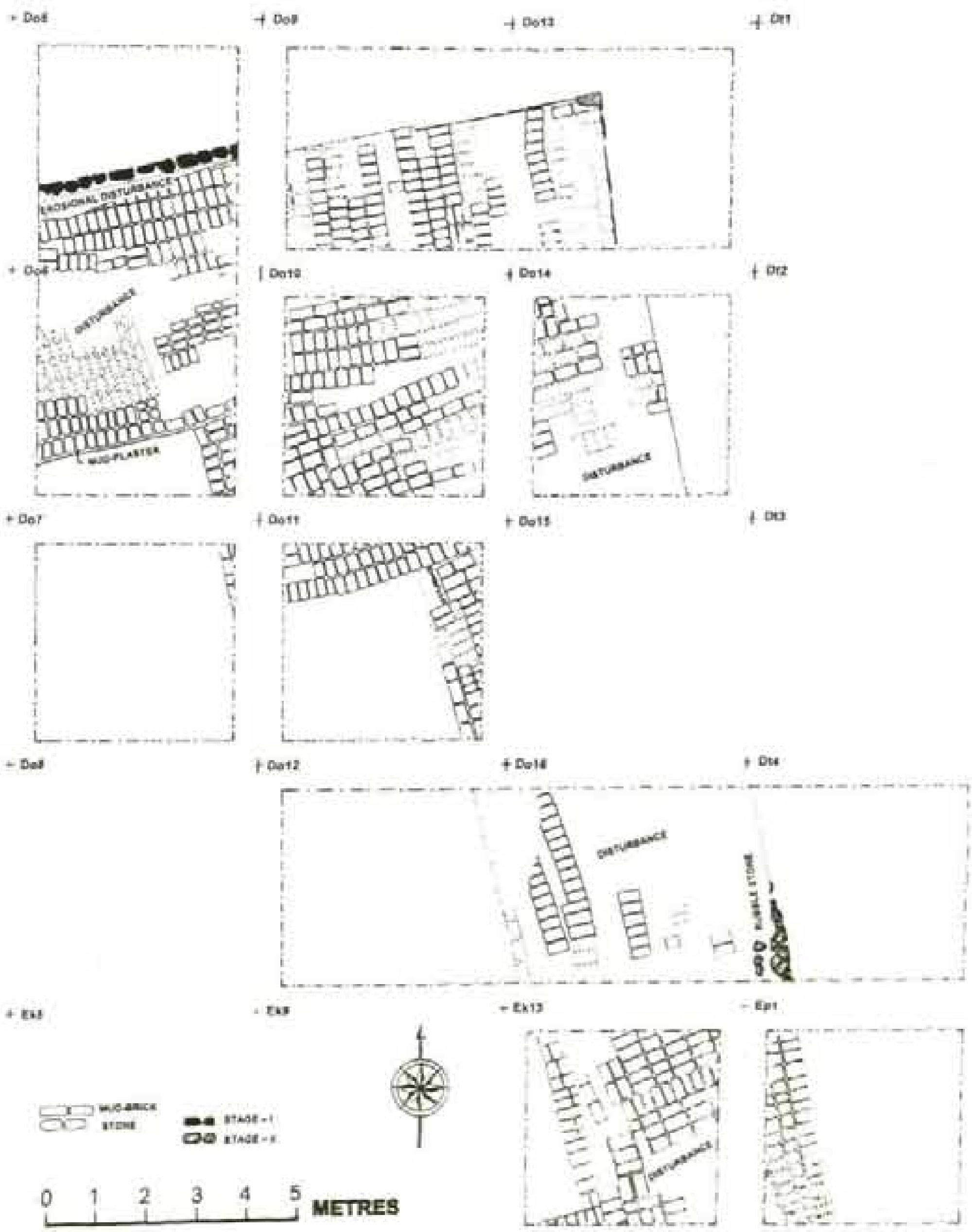


Bagasra : pottery from phase I — 1, 3, 4, 6, 10, 11, *red ware;* 2, 5, 7, 8, *gritty red ware* & 9, *buff ware*

Fig. 7

BAGASRA - 1997

TRENCH—Do5-7, Do9-14, Do-16, EP-1 & EK-13
PLAN OF PERIPHERY WALL—NORTH-EAST CORNER



was provided to the internal and external sides of the wall in the last stage of its reconstruction probably for strengthening it. Although the stones have been robbed off from many places, at least seven vertical courses in the bracing wall could be traced in the Trench El 15. The mud-brick wall unearthed last year in the northern side of the settlement had either a stone foundation or a stone encasing at the base at a depth of 4.10m. This could not be ascertained if this feature was repeated in the southern side as well, since none of the trenches within the fortified area could reach upto this depth in the current season.

Several evidence showing the industrial production of faience objects and beads of semiprecious stones and shell objects are found in the Trench Eq2 at the southeastern corner of the fortification wall. Along the internal bastion at this corner was found a small fireplace demarcated by a single course of bricks and showing marks of intense burning. A good number of faience beads are found from this fireplace along with fine whitish ash and bits and pieces of charcoal. Two large pots partially buried in the ground are found adjacent to this fireplace. Some kind of whitish, calcareous material is found sticking at the bottom of both the vessels whose upper half is broken off and missing. From the features described above it appears that this was a workshop used for the production of faience objects.

By the side of this foundry are found three or four clay lined storage bins or silos of varying dimension. Two of them contained a large collection of huge chunks of a special variety of agate/chert and moss-agate as if it were hoarded in the silos. A finely polished lenticular bead of the above stone recovered from one of the silos indicates that this semiprecious stone was certainly meant for the production of beads and other lapidary items. Beads made of this particular stone are very rare even at the major metropolitan centres like Mohenjodaro, Harappa, Kalibangan, Dholavira and Lothal. The hoards of raw material found from Bagasra may, therefore, indicate some amount of monopoly enjoyed by the Harappan community at Bagasra in the production and distribution of the above beads.

In addition to this, one of the bins contained a few large intact as well as cut *Turbinella Pyrum* shells. One of these shells shows circular marking by a saw for cutting off circlets. This is in addition to a host of evidences unearthed from the site for the industrial production of shell bangles, ladles, beads and pendants. A broken half of a shallow stone dish carved out from dark grey basalt is also found from the same silo. Both interior and exterior of this vessel are well ground and it has a smooth polished surface; the edges, however, show marks of battering, indicating its heavy use.

The excavation has also brought to light an inscribed Harappan steatite seal and a few terracotta sealings. The seal (pl. 16) is a small square steatite tablet bearing engraved inscription and the figure of a one horned bull and a standard in front of the beast on one side and a projected boss with a small hole passing through it on the opposite side. This is found in the upper levels in the Trench El 15 belonging to the phase II of the cultural sequence at the site. Yet

PLATE 16-17



16



17

Bagsara : 16, inscribed steatite seal: 17, copper vessel with a hoard of bangles and celt

another interesting object that has been found in the upper layers of the same trench is a *handi-type* copper vessels with a sharp carinated shoulder. It contained a hoard of eight copper bangles and a small celt (pl. 17). This is in addition to a chisel-like rod, a rectangular knife and several small wires and rods of copper recovered from different trenches at the site. A very well preserved narrow copper spatula unearthed from the bottom may indicate that copper was in use right form the very beginning of Chalcolithic occupation at the site.

Among other antiquities reported from the excavation mention must be made of tubular beads of carnelian, lapis lazuli, amazonite, agate and jasper, wafer-thin disc beads and micro-beads of steatite, a small weight/gamesman of amazonite, terracotta toy-objects like the cart-frames and wheels, tops, tetotum discs and hopscotch discs. Lithic artifacts included long ribbon blades of Rohri chert and small backed blades on locally available chert and jasper. A broken cylindrical micro-drill bit and another specimen resembling the foliated variety of drill bit are also found in the excavation.

The final remains collected from the excavation included skeletal elements of both terrestrial and aquatic fauna. Being very close to the seashore, fishing seems to be one of the important occupations of the people. A large number of fish vertebrae, spines and otolithis of three or four different variety of fish are found in all the four phases of the habitation at the site. In addition to these, they have also exploited other aquatic food items like crabs, turtles and bevalve shells. A maximum abundance in the remains of the aquatic fauna is found in the last stages of phase II and during the phase III.

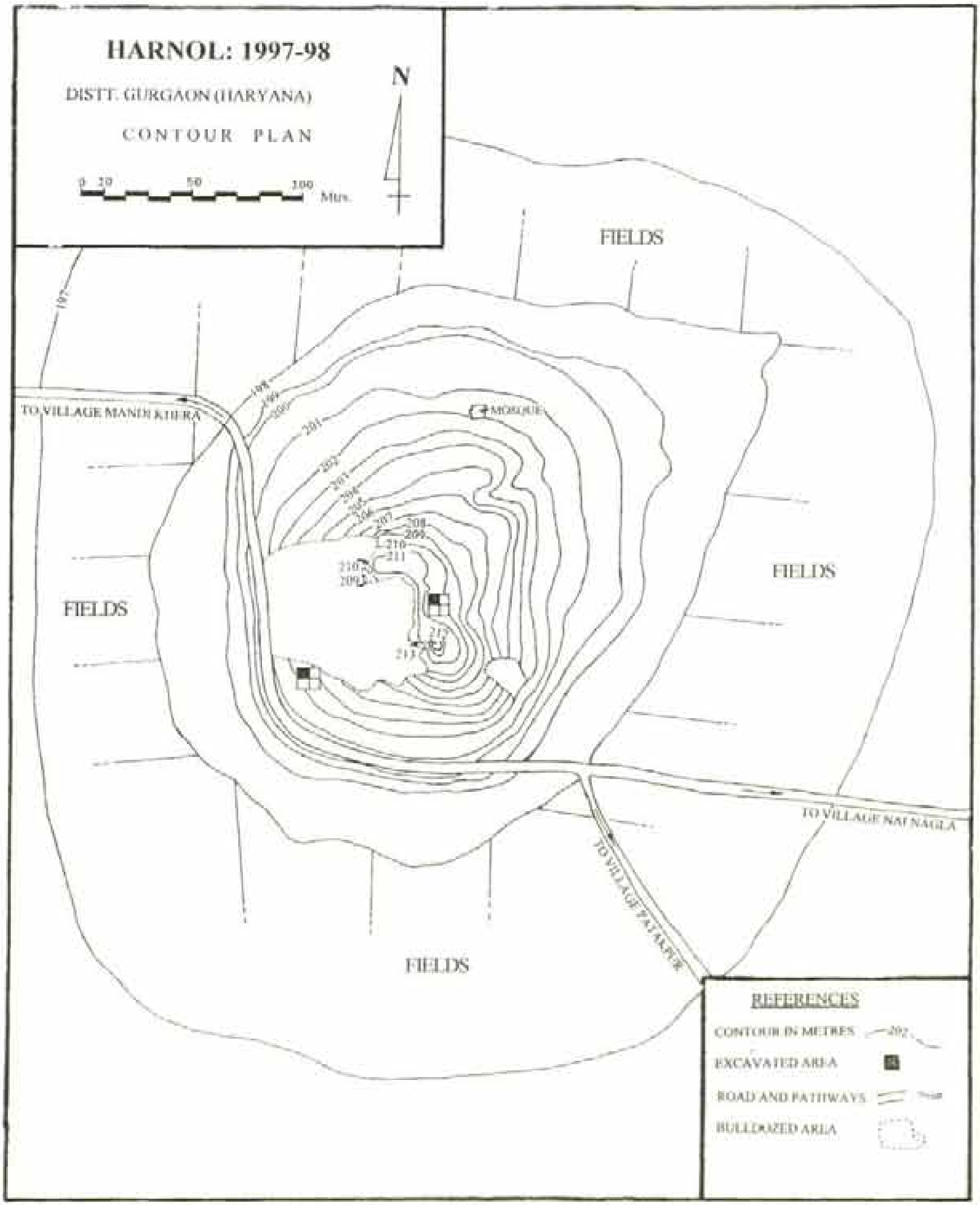
HARYANA

17. Excavation at Harnol, District Gurgaon

Excavation Branch II, New Delhi, of the Survey, under the direction of B.R. Mani, assisted by Vishnu Kant, Ajay Kumar Srivastava, B.K. Chauhan, Vinod Kumar, Ram Kumar, V.P. Verma, Y.S. Nayal, Ajai Kumar, Suresh Chaudhary, D.N. Yadav and Mohan Sharma carried out excavation at the site, located about 5 km south of Muhammadnagar, simultaneously when the latter was being excavated. The site is approachable through a 1.5 km long approach road from Mandikhera towards east of Delhi-Alwar road at a distance of about 99 km from Delhi and 6 km from Muhammadnagar in the Firozpur Jhirka subdivision of Gurgaon district. The mound (fig. 8) was found to be damaged in the recent past towards its western half from where the earth was cut and removed for strengthening the roadsides which were damaged and eroded in the area after excessive rains and breaches in nearby Rawli and Kameda dams.

With the objective to confirm the cultural sequence and to know about the importance of the site, squares measuring 10 x 10 m were laid and two quadrants of squares Al and XF4 were excavated. Quadrant 1 of Al at the top of the mound was excavated upto the depth of 16 m and quadrant 1 of XF4 on the southwestern slopes of the mound. Natural soil could not be encountered

Fig. 8


HARNOL: 1997-98
DISTT. GURGAON (HARYANA)
CONTOUR PLAN
0 20 50 100 Mtrs.
N
FIELDS
FIELDS
FIELDS
FIELDS
TO VILLAGE MANDI KHERA
MOSQUE
TO VILLAGE NAI NAGLA
TO VILLAGE PATAKPUR
REFERENCES
CONTOUR IN METRES
EXCAVATED AREA
ROAD AND PATHWAYS
BULLDOZED AREA

as the space left for further excavation had become too narrow.

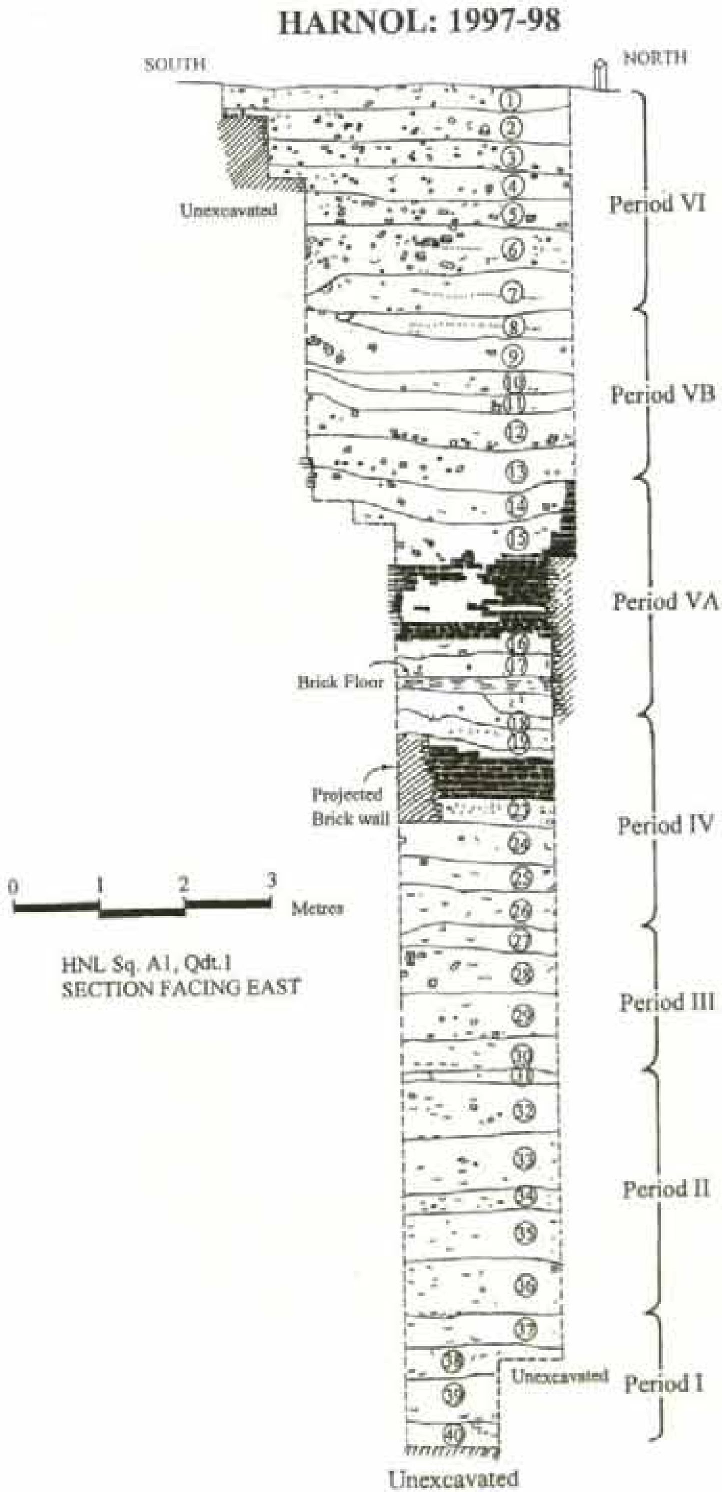
The excavation was carried out upto a depth of 16 m from the top having structural phases of different periods with forty habitational layers (fig.9). Layers 37 to 40 represent Period I having occurrence of black-slipped ware and red ware. Layers 31 to 36 represent Period II having sherds of Painted Grey Ware (PGW), grey ware and red ware. It seems that PGW phase overlapped with NBPW phase as terracotta plaques including one depicting a lady figure were found from the deposits. Other important antiquities were terracotta animal figurines, bangles, beads including arecanut shaped ones, balls, bone point and carnelian bead. NBPW sherds along with associated red ware were found from layers 27 to 30 representing Period III. The deposits contained *ghata* shaped and arecanut shaped terracotta beads, disc, glass and carnelian beads, terracotta and shell bangle pieces and terracotta wheels.

Layers 18 to 26 belong to Period IV represented by brick structures and a brick paved floor associated with it (pl. 18) The deposits represent the Sunga period and iron objects, lower part of a terracotta mould showing human legs, terracotta ear stud, part of bird shaped toy cart, and arecanut shaped bead and a crucible were found from the deposits.

The ceramics include red ware only with shapes having incurved bowls with flattened broad base and thin section in medium to coarse fabric, vases with undercut flared rim, vase with collared rim and having perforation below the rim, rim of vase with long neck and parallel graved decoration on the outer face of vase with out-turned rim and a band below the neck, carinated *handi,* lids and basins with nail headed thickened rim.

Nearly 6.5 m deposit above the Sunga levels can be assigned to the Kushan period which has been divided into two sub-periods-VA belonging to the Kushan phase and V B belonging to the Late Kushan phase. Sub period V A is represented by layers 14 to 17 having four structural phases attached with them. The structures contain typical Kushan bricks. Average size of bricks was 36x22 to 25x5 to 6 cm. From the exposed western section of the mound Kushan structures in a series were noticed badly damaged by bulldozers while taking out earth in the recent past. Two structures with burnt bricks having 54 and 46 courses respectively besides a number of others were seen there. Iron arrow-head and part of a shell bangle were found besides red ware, both plain as well as decorated. Layers 8 to 13 belong to the sub period V B, from the deposits of which bone points, terracotta human figurines (pl. 19), beads, decorated tile with floral design (pl. 20), skin rubber and part of a grey soapstone lid were found. A piece of plate of grey soapstone with two fishes holding stem of lotus in their mouth is an interesting find (pl. 21). The most important artefact from these levels is a terracotta relief (pl. 22) of a crowned seated male deity with moustache and flames emanating from his shoulders which can be identified with Agni or fire-god. Red ware from the Period V contain externally oblique-

Fig. 9


HARNOL: 1997-98
SOUTH
NORTH
Unexcavated
Period VI
Period VB
Period VA
Brick Floor
Projected
Brick wall
Period IV
0
1
2
3
Metres
HNL Sq. A1, Qdt.1
SECTION FACING EAST
Period III
Period II
Unexcavated
Period I
Unexcavated

PLATES 18-19



18



19

Harnol : 18, structure and floor, Sunga period; 19, terracotta objects, Kushan period

PLATES 20-21



20



21

Harnol : 20, decorated tile ; 21, stone objects, Kushan period

PLATES 22-23



22

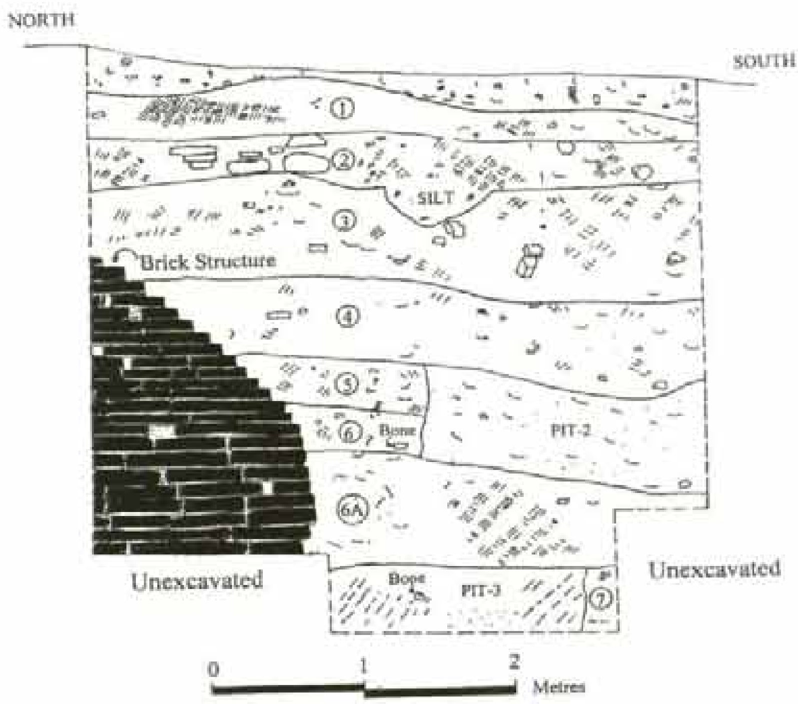


23

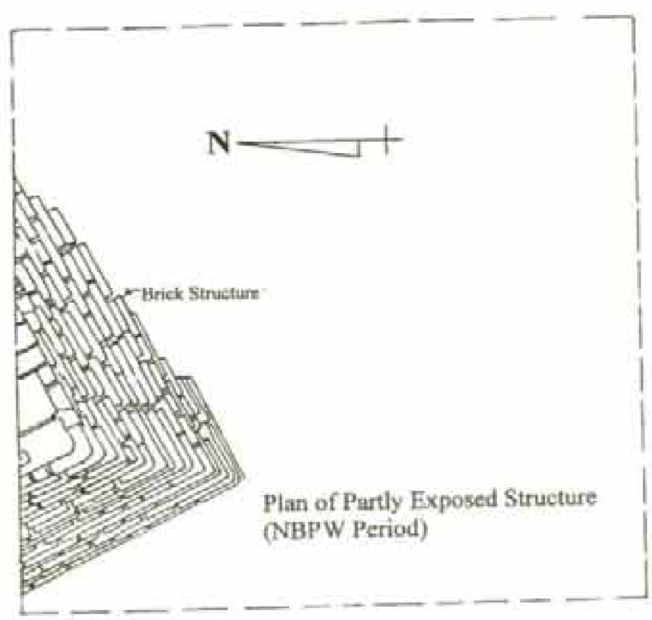
Harnol : 22, seated terracotta figurine, Kushan period ; 23, partly exposed structure, NPBW period

HARNOL: 1997-98

Fig. 10



HNL Sq.XF4, Qdt.1
SECTION FACING WEST



Plan of Partly Exposed Structure (NBPW Period)

cut rims of large bowls with or without thumb impression on the interior and tapering sides having string cut disc base with diameter approximately 18 to 20 cm and height of about 8 cm, basins, miniature pots, plain spouts, splayed out rims of *handi,* plain and painted vases, centrally placed knobbed lids, thick lids with inverted disc top, lids with cup shaped depression and hopscotches made out of red ware.

Period VI belongs to late medieval period when some construction of stone and brick masonry were made, remains of which were noticed from the top levels represented by layers 1 to 7 having associated red ware and glazed ware. An iron arrow-head, pieces of glass bangles and beads were found.

An interesting structure (pl. 23) with large size bricks measuring 72 x 48 x 8 cm in the ratio of 1:6:9 was partly exposed in sq XF 4 Qd 1 which belongs to Period III (fig. 10). Twenty-three courses of bricks were found in the 2 m high structure. The western and southern faces of the wall at the southwestern corner exposed during excavation have tapering nature which suggests that it may be the base of a Mauryan stupa.

18. Excavation at Muhammadnagar, District Gurgaon

Excavation Branch II, New Delhi, of the Survey, under the direction of B.R. Mani, assisted by Vishnu Kant, Ajay Kumar Srivastava, B.K. Chauhan, Vinod Kumar, Ram Kumar, V.P. Verma, Y.S. Nayal, Ajai Kumar, Suresh Choudhary, D.N. Yadav and Mohan Sharma carried out excavation at the site which is also known as Havananagar, located on Nagina-Hodal road at a distance of 5.5 km from Nagina and 100 km from Delhi, approachable through Delhi-Alwar road. The mound (fig. 11) was found to be damaged in the recent past towards its southern part in similar fashion as the damage occurred at nearby site at Harnol.

Trenches in forms of squares measuring 10 x 10 m each were laid and five quadrants of four squares were taken up for excavations. Excavations continued upto natural soil in sq XA2 Qd 3 (fig. 12) giving complete cultural sequence of the site and also in sq A1, Qd 4 (fig. 13).

Thirty-four habitational layers were encountered in both the trenches and natural soil was confirmed below layer 34 in sq XA 2, Qd 3 having *kankar* deposits through which water started oozing out. Regular excavation was carried out in this quadrant from layer 11 to 34 as the top layers were removed in the recent past when the mound was cut for taking away the earth. From the exposed section of the mound towards north and north-east of the quadrant two metre wide section scraping upto the top of the mound in sq A2, Qd 4 gave the connecting upper sequence of the site (pl. 24-25). Cultural sequence of the site is quite similar to that noticed at Harnol, another site in the neighbourhood.

A 35 cm thick deposit over the *kankar* mixed natural soil and water in sq XA 2, Qd 3 yielded

Fig. 11

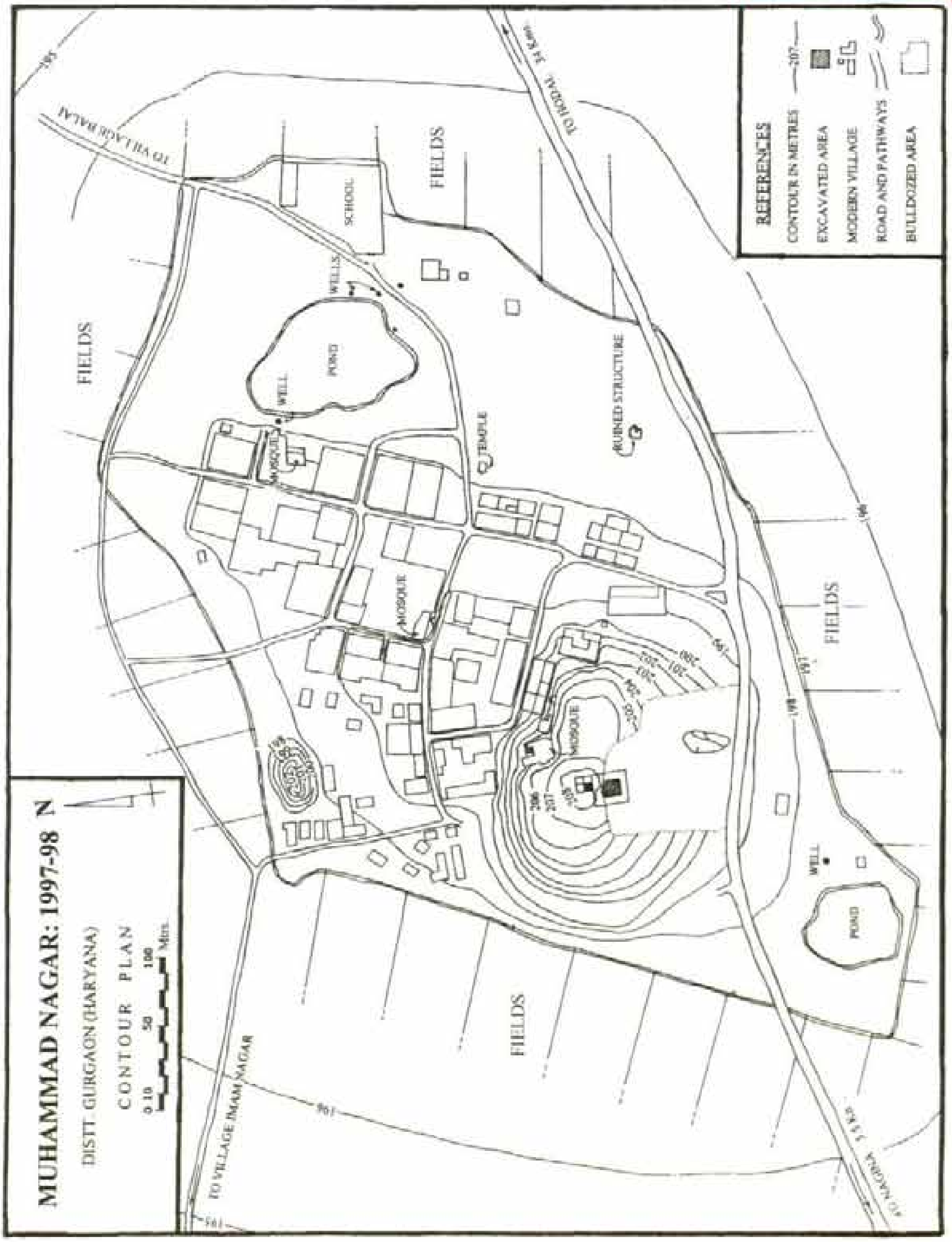

MUHAMMAD NAGAR: 1997-98
N
DISTT. GURGAON (HARYANA)
CONTOUR PLAN
0 10 50 100 Mtrs.
REFERENCES
CONTOUR IN METRES
EXCAVATED AREA
MODERN VILLAGE
ROAD AND PATHWAYS
BULLDOZED AREA
FIELDS
FIELDS
FIELDS
FIELDS
TO VILLAGE BALAI
TO HODAL
SCHOOL
WELLS
POND
WELL
MOSQUE
TEMPLE
RUINED STRUCTURE
MOSQUE
MOSQUE
WELL
POND
TO VILLAGE IMAM NAGAR
TO NAGINA

Fig. 12

MUHAMMAD NAGAR: 1997-98

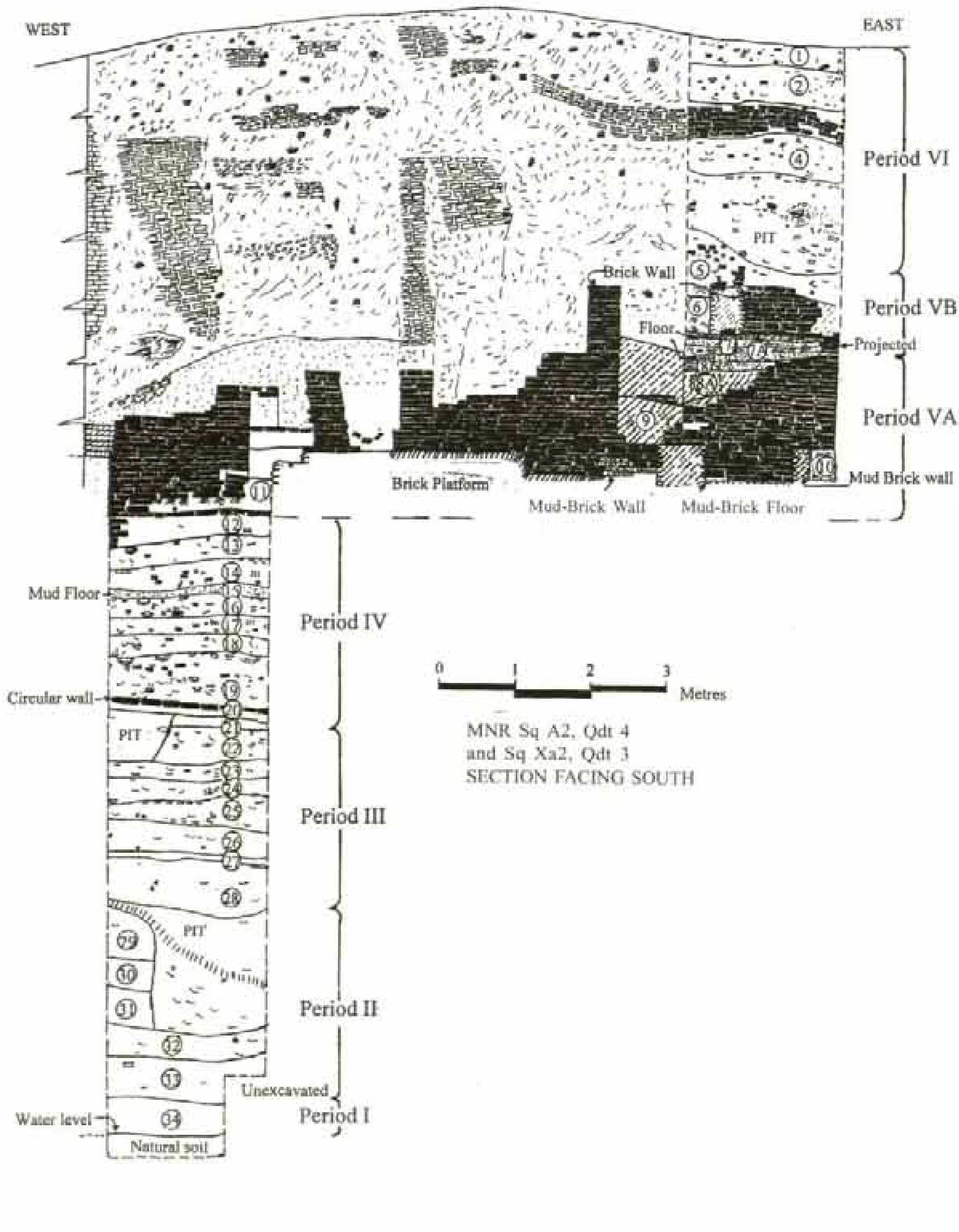
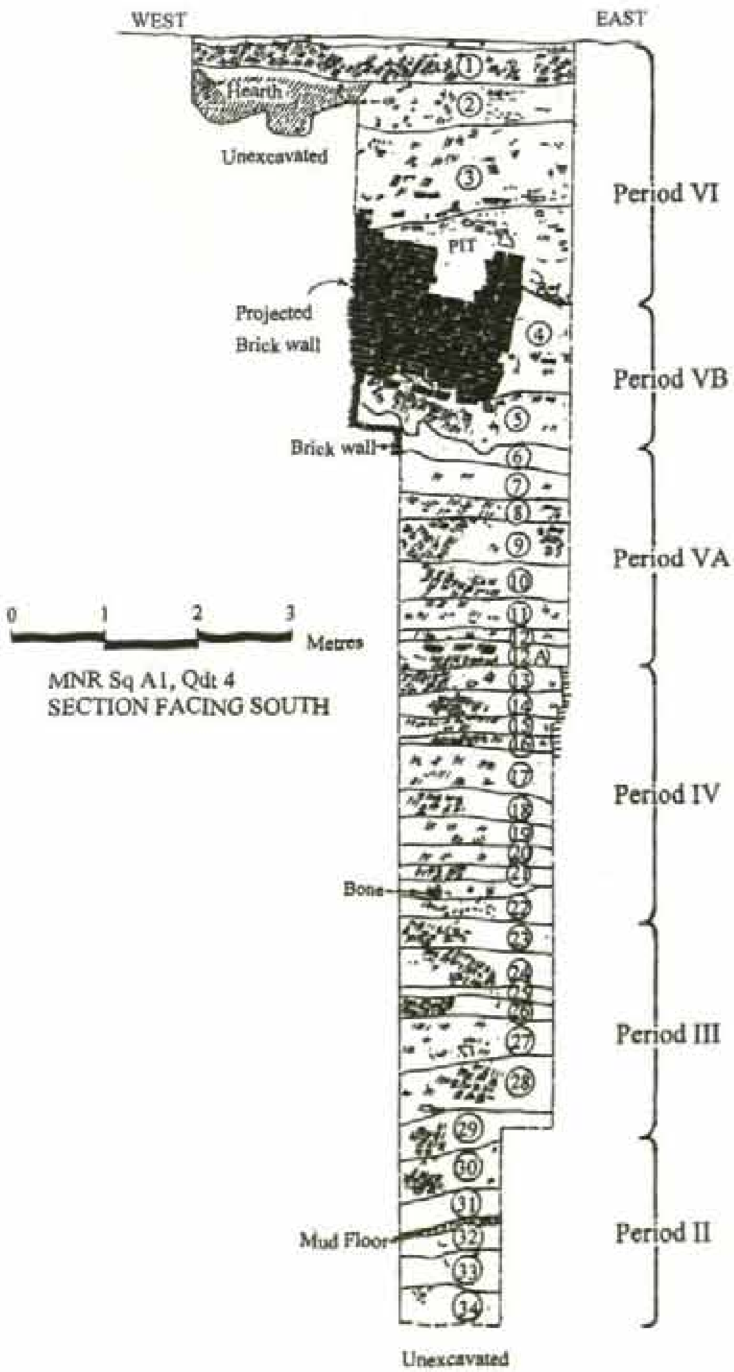


Fig. 13

MUHAMMAD NAGAR: 1997-98



PLATES 24-25



24



25

Muhammadnagar : 24, *general view of excavated remains;* 25, *structures of Kushan period*

sturdy red ware sherds which were not found in the upper deposits. This layer represents Period I of the site. Period II was represented by layers 29 to 33 having red ware, grey ware and some sherds of PGW. Similar deposit in sq Al, Qd 4 containing layers 30 to 34 yielded black-and-red ware, grey ware and red ware. Iron objects were found from these deposits.

Layers 22 to 28 in sq XA 2, Qd 3 and 23 to 29 in sq A1, Qd 4 represent the deposit associated with NBPW belonging to period III. Remains of a brick wall having four courses and a drain with vertically placed bricks in east-west orientation were noticed. Evidence of post-holes suggesting existence of thatched huts were also found associated with layers 23 and 24. Red ware was the main ceramic industry and sherds of grey ware and NBPW were also found.

A deposit of about 3 m having layers 12 to 21 in sq XA 2, Qd 3 and 13 to 22 in sq A1, Qd 4 represents the Sunga period deposit of Period IV. Lowest course of a circular structure with wedge shaped burnt bricks was found which may be the evidence of a stupa (pl. 26). From its sealing deposit three similar terracotta sealings with the figure *of yupa* were found (pl. 27). Associated with the upper deposits were remains of two structural phases, each having six to eight remaining courses of brick walls. Terracotta bangle pieces, stone and terracotta beads, broken parts of terracotta plaques with human figures, terracotta animal figurines and other minor antiquities were found. Incurved bowls and other shapes in red ware comprised the ceramic industry of the period.

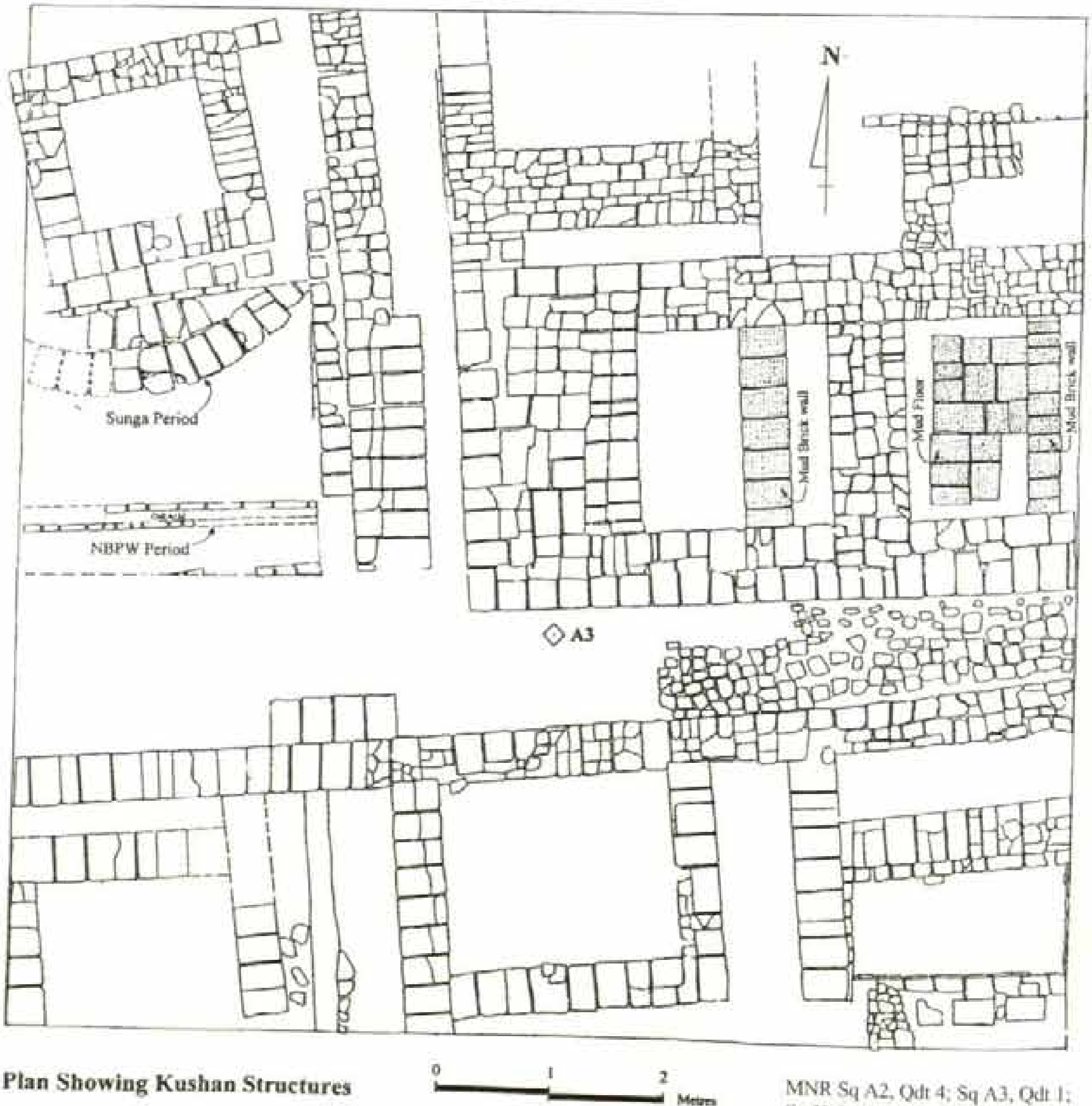
A 4 m deposit of Period V at the site belongs to Kushan period with two sub-periods — V A having layer 8 to 11 in sq XA 2, Qd 3 and 6 to 12 A in sq A1, Qd 4. Sub-period VB contains layers 5 to 7 in sq XA 2, Qd 3 and 4 to 5 in sq. A 1, Qd 4. These sub-periods have distinct structural phases and evidence of additions and alterations.

Structures of Kushan period were exposed in sq A2, Qd 4, sq A3, Qd 1, sq XA 2, Qd 3 and sq XA 3, Qd 2 horizontally just below the level upto which part of the mound was cut and earth removed for strengthening the sides of roads in the recent past. Kushan structures in the form of house complexes with various size of atleast five rooms were noticed here on either side of a narrow lane running from east to west having average width of 80 cm and paved with brick-bats (fig. 14, pl. 28). Size of the rooms were found 1.70 x 1.90 m, 1.75 x l .84 m and 1.27 x l .22 m. Typical Kushan bricks measuring 42 x 26x 6 cm and 36 x 22 to 24 x 5 to 6 cm were found to be used in construction of rooms. Sometimes these bricks were also used for paving the floors. One of the rooms was found divided by mud-bricks at a later stage of its use (pl. 29). Evidence of a floor paved with mud bricks was also found in one of the rooms. Width of the walls vary from 42 cm to 75 cm.

A sunken wall of twenty-six courses of bricks with an opening in its upper courses suggesting evidence of a window was noticed in sq. Al Qd 4 (pl. 30). From the exposed southern section of the damaged part of the mound several huge structures

Fig. 14

MUHAMMAD NAGAR: 1997-98



Plan Showing Kushan Structures

MNR Sq A2, Qdt 4; Sq A3, Qdt 1; Sq Xa2, Qdt 3 and Sq XA3, Qdt 2

PLATES 26-27



26



27

Muhammadnagar : 26, *circular structure, Sunga period and drain, NBPW period;* 27, *terracotta sealings*

PLATES 28-29



28



29

Muhammadnagar : 28, excavated structures; 29, brick and mud-brick structures

PLATE 30



Muhammadnagar : excavated structures, Kushan period

PLATES 31-32



31



32

Muhammadnagar : 31, terracotta human figurines; 32, terracotta animal figurines, Kushan period

PLATES 33-34



33



34

Muhammadnagar : 33, bird-shaped terracotta toy-cart and wheel; 34, terracotta bangle pieces

PLATES 35-36



35



36

Muhammadnagar : 35, semiprecious stone beads; 36, coins

PLATE 37



Muhammadnagar : seated stone image

were noticed, some of which rising upto about forty courses of bricks.

Terracotta human and animal figurines (pls. 31 - 33), bangles (pl. 34), beads, stone beads (pl. 35) and four Kushan copper coins were found. Red ware shapes from Kushan levels include bowls, basins, vases, lids and lamps.

Layers 1 to 3 in sq Al, Qd 4 are associated with the late medieval deposit of Period VI. Part of a structure was exposed in the southern part of the trench which was constructed by using bricks and stones. A large hearth was also noticed full of ash. Some interesting dishes of fine red ware besides other ceramics in associated red ware were found. Seven courses of a structure with reused bricks are also noticed in section scraping. These structures are seemingly contemporary to the period of construction of the mosque towards north-east of the trench on the mound.

The site has also yielded a silver and a copper punchmarked coin besides Kushan coins (pl. 36) and a loose mutilated sculpture (pl. 37) of a seated deity in red sandstone.

19. Exploration in Mewat Area, District Gurgaon

B.R. Mani of the Excavation Branch II, New Delhi, of the Survey, assisted by Vishnu Kant, Ajay Kumar Srivastava, Vinod Kumar, Suresh Chaudhary and Mohammad Nooman carried out explorations in the Mewat area of District Gurgaon.

Two low rocky ranges, which are the continuation of the Aravalli chain, enter in Mewat region from the south and run towards north. In the plain area lying in-between these ranges and towards their east there are a number of early historical sites with their antiquity going back to the protohistoric period. Large sites such as Autha, Muhammadnagar, Bhadas, Malab, Gohana, Hathin, Ata, Mundehta (Mundheta), Mamlika, Gokalpur, Luhinga and Papra are known sites in the region. Some new sites were discovered during the explorations like Harnol, Mandikhera, Gangwani, Jamalgarh and Paimakhera which are all very important in view of the rich archaeological material found at these sites. Muhammadnagar and Harnol were excavated by the team.

At Papra two mounds were seen having medieval ceramics on the surface. At Lunhinga four separate mounds yielded medieval pottery.

Approximately 100 x 100 m area is covered by the mound at Gokalpur having a deposit of about 2 m from where Kushan red ware was found. Mundehta (Mundheta) is an important site which is spread in an area of about 150 x 150 m. PGW, black-and-red ware, black-slipped ware and red ware were found from the site which has a deposit of 5 to 6 m in height.

Amongst the newly discovered sites by the team, Mandikhera is spread in an area of about 200 x 200 m having cultural deposit of 10 to 12 m in height. Kushan red ware and bricks measuring 36 x 22 x 6 cm were found besides medieval glazed ware. Kushan red ware was found at Gangwani I which is a mound covered by modern

habitation and spread in an area of about 150 x 150 m with its cultural deposit of 8 m in height. Gangwani II is a small circular mound with brick-bats and deposit of about 2 m in an area with its radius around 20 m. Black-slipped ware and red ware were found from here. Jamalgarh is an imposing site with its height of 10 to 12 m and area of about 200 x 200 m. Sunga-Kushan red ware and bricks measuring 35 x 21.5 x 6.5 cm and wedge shaped bricks measuring 33x21 to 9.5 x 7 cm were found. Another early historical site discovered during exploration was Paimakhera, spread in an area of about 150 x150 m with its height of about 10 m. Grey ware and red ware formed the main ceramic assemblage. Various sizes of bricks were noticed, such as 42 x 22.5 x 6.5 to 7 cm, 28.5 x 28.5 x 9 cm, 35 x 25 x 7 cm, 46 x 23 x 6.5 cm and 43 x 28 x 8 cm. On a hillock towards east of Rawa at Dhodanka medieval structures and red ware were found.

20. Excavation at Rakhigarhi, District Hissar

The Institute of Archaeology alongwith the Chandigarh Circle of the Survey, under the direction of Amarendra Nath and P.K. Mishra, assisted by Alok Tripathi, M.P. Jain, R.S. Rana, L.S. Mamani, R.K. Dalai, Ramji Chaudhary, Umesh Kumar, N. K. Kharab, R.K.Manik, P.S.Rawat, Manbir Singh, Madan Lai, Piyush Bhatt, Rahul Bhosle, Jasmer Singh and Vinod Dhingra took up excavations at this Harappan site which was reported earlier (*1963-64,* p. 90; *1966-67,* p. 12; *1980-81,* p. 16; *1987-88,* p. 27). Apart from imparting training to the PGDA students in the field of archaeology, excavation at the site was taken up with a view to ascertain the stratigraphical positions of early, mature and late Harappan periods as reported earlier in the course of exploration, and lay bare sizeable portions of the settlement of each period besides correlating the nature of settlement with other excavated sites of the region. During this field-season, the excavations, without reaching the natural soil, revealed the deposits of mature Harrappan period.

There are five notified mounds out of which RGR-1, RGR-2 and RGR-3 are relatively free from encroachment while RGR-4 and RGR-5 are thickly inhabitated by the twin villages- Rakhikhas and Rakhishahpur. RGR-1, stretching east-west, is 6m high from the surrounding plains, lies on the northern extremities of RGR-3. RGR-2, apparently appears to be a citadel mound, is approximately 14m high (pl. 38). Parallel to the east of RGR-2 lies RGR-3, rising to a height of 12 m. The southern part of RGR-2 further seems to have been interlocked with RGR-4 and RGR-5, while its northern contour elevations show features of an entrance.

At RGR-1, four quadrants of G5 and two quadrants of G6 were subjected to excavations. In G6 the excavation was carried out to a depth of 4.70 m. The cutting revealed five structural phases of which phases 1 to 4 were aligned, on either side, to a lane (1.50 m wide) running north-south.. The mud-bricks used in these structures were of various sizes but the ratio noted was 1:2:4. The bricks were laid in clay mortar alternately by layers of headers and stretchers. The structure of phase 1 was in the form of a kitchen (2.60 x 1.80 m)

PLATES 38-39



38



39

Rakhigarhi : 38, general view of citadel mound; 39, excavated trenches at citadel mound, Period II

accommodating a *chulha* in the south-east corner and an in-built platform (65 cm x 30 cm) in south-west corner. The structures of phase 2 showed ten courses of mud-bricks in the southeastern corner. The succeeding mud-brick structure (2.40 m) of phase 3 had an entrance (80 cm wide) on the eastern side, perhaps a part of larger structural complex. The western arm of the wall had three courses while the southern had fourteen. In phase 4, a mud-brick wall of eleven courses was noticed. The structures of phase 5 were not in exact alignment to the structures and lanes of the preceding phases. In this phase a significant structural-complex of storehouse was reported, consisting of an entrance free three-celled mud-brick structure and platform of mud-bricks-on-edge. Periodically, the levels of floor of each cell were raised by soling of reused *mustikas* and terracotta cakes, maintaining slopy or saggy finish. Here, the cells and the platform complement each other in deciding its function as 'storehouse'. After the desertion of the mature Harappan settlement at the site, it was used as burial ground during the late medieval period. The oblong burial chambers, oriented north-south, were invariably covered by mud-bricks of 1 : 2 : 4 ratio, which gave false impression of their being Harappan in antiquity. No grave goods were reported from these burial-chambers as these had signs of robbing.

At RGR-2, the excavations were subjected to the northern slope of the mound with a view to locating structural components of the entrance to citadel, and towards the southern locality with a view to examine various phases of settlements. The cuttings on the western arm of the entrance revealed a series of east facing guard cells in north-south alignment. The floors of these cells had reported a few typical copper and bone arrow-heads and points, justifying its function. The cuttings in the southern location of RGR-2 revealed structures on either side of intersecting lanes and by-lanes of different functions, which included mud-brick platforms, fire altars, specialised craft activity area, granary, shops, drains, etc (pl. 39). Mud-bricks were extensively used in the construction, while burnt bricks were used in drains, steps and in the veneering of mud-brick platforms. Some of the mud-brick walls had mud plaster over them as preservative coatings. A cell with in-built niche (pl. 40) also had mud plaster. The cuttings of R-21 exposed an impressive oblong verandah supported by squarish pillars (90 cm) and pilasters. Next to this complex, in S-21, were located four cells in a row used by specialised craftsmen, as its floor revealed brick lined hearths, stone anvil, pounder together with debitage of columellae of *Xancus pyrum,* suggesting intra-regional trade contacts. A modest granary, consisting of tiny cells in two segments, was noticed in the cuttings of S-22 and T-22. The accumulated sediments of the cells had yielded *Hordeum vulgari,* a variety of barley. In T-23, a T- shaped covered drainage system was noticed, laid in the centre of a street with slope towards south (pl. 41). Besides, a system of house drain of terracotta pipes was also noticed in this cutting. In X-25, covered house drains originating from bathing platforms were also exposed.

PLATES 40-41



40



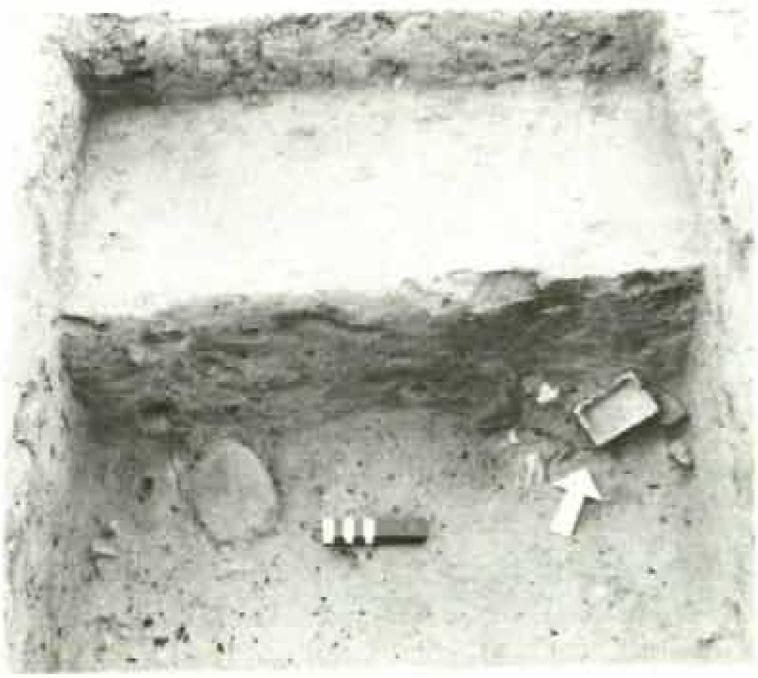
41

Rakhigarhi : 40, view of niche, Period II; 41, covered public drainage system, Period II

PLATES 42-43



42



43

Rakhigarhi : 42, apsidal structures and fire-altar, Period II : 43, mud-brick lined pit and votive tank, Peroid II

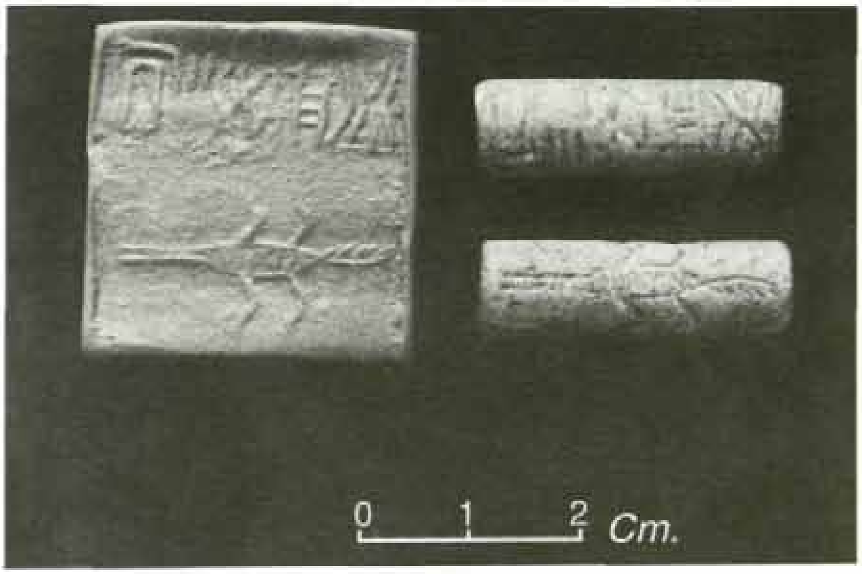
A medium size structure, oriented north-south, was exposed from the middle level of S-22. A segmented niche of single coursed burnt bricks was noticed towards the apsidal end; the floor had brickbat soling, overlain by mud floor. A terracotta bull was located from its floor, slightly dislodged from the niche. From the north of this apsidal structure a hollow T-shaped fire altar, oriented east-west, containing ash and bits of charcoal was noticed (pl. 42). Further north, in the same alignment, a mud-brick lined oblong pit chamber (longer axis east-west) containing fresh animal bones of bovine family mixed with ash and charcoal was exposed. Apart from this the pit also contained a terracotta votive tank and pottery pieces of dishes (pl. 43). Further, from the same level of T-23 was reported three circular fire altars over the mud floors of an enclosed structure; these fire altars had mud-brick bases and were laid in a semicircular order a few tiny hollow circular white outlines, possibly indicative of remains of burnt hard shells of fruits offered to the fire altars, was also noticed.

The pottery mainly falls in two groups namely red ware and grey ware, besides non-glazed reserve slipped ware, cut ware, cream-slipped ware and 'barbotine' ware in limited frequency. Important types in red ware included perforated jars, goblets, dish-on-stand, vases, jars, ledged rim vessels, fluted vessels, ribbed vessels, dishes, basins, troughs etc. The important painted motifs in red ware *were pipal* leaf, palm leaf, triangles, loops, intersecting circles, birds and scales etc. The frequency of grey ware with or without black slip was limited as compared to the red ware. Main shapes in grey ware were vases, dish-on-stand, dishes, bowls and lids.

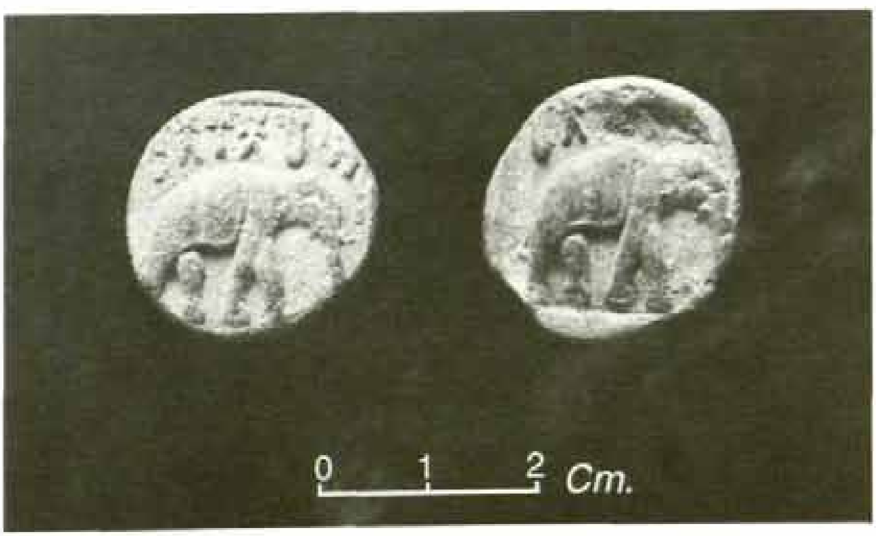
The final evidence provides reflexes on man-animal relationship, together with their associated food habits. Cattle bones out number other animal bones, including that of wild variety, which indicates existence of highly rich pastoral land in the neighbourhood. Among the cattle, domesticated buffaloes were preferred both for abundant milk and meat. Occurrence of rodent bones support the hypothesis of sedentary life style and food habit of the Harappan people at the site, besides storage of food grains. Lower percentage of wild animal bones suggest limited hunting activity and more reliability on plant food. The presence of fish bones not only suggest dietary but also fishing as one of subsistence traits; likewise occurrence of bird bones suggest that they formed part of their diet. Among the floral remains only charred wheat and barley could be identified so far.

Amongst the important finds mention may be made of a cylindrical seal (pl. 44), squarish seals and terracotta amulets (pl. 45). Apart from this a copper vessel (pl. 46), containing a gold fillet, five silver bangles and a cluster of silver rings (pl. 47), were also found from the stratified deposit. Further, bangles of copper, shell and terracotta, beads of gold, siliceous material, steatite and faience, weights and measures of terracotta and stone (pl. 48), gamesman and model of game-board of stone and terracotta, chert blades, copper arrow-heads, bone points, terracotta tiles with intersecting circles and terracotta figurines (pl. 49) deserve reference.

PLATES 44-45



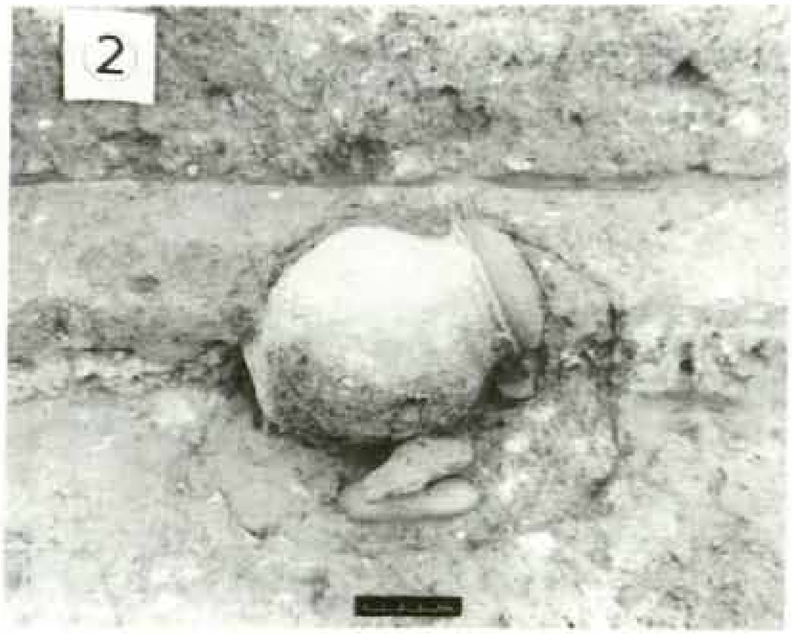
44



45

Rakhigarhi : 44, cylindrical seals of faience, Period II; 45, terracotta amulets, Period II

PLATES 46-47



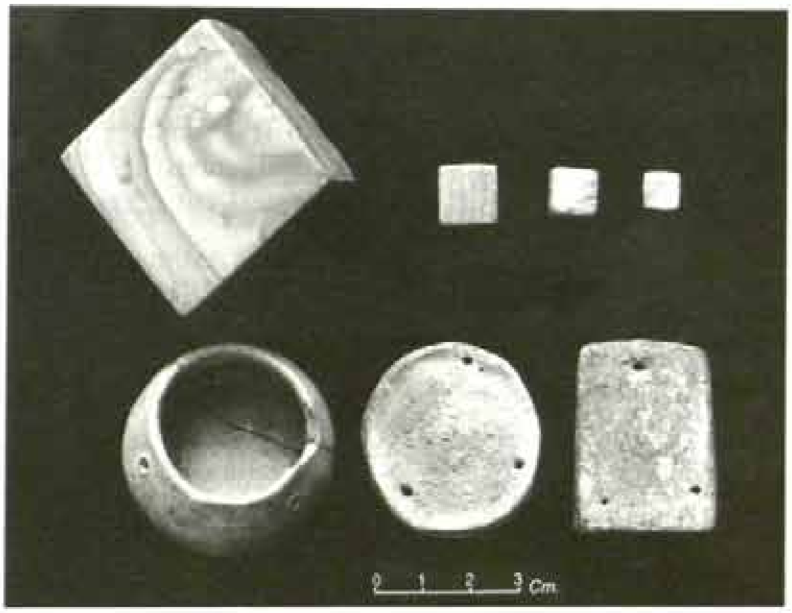
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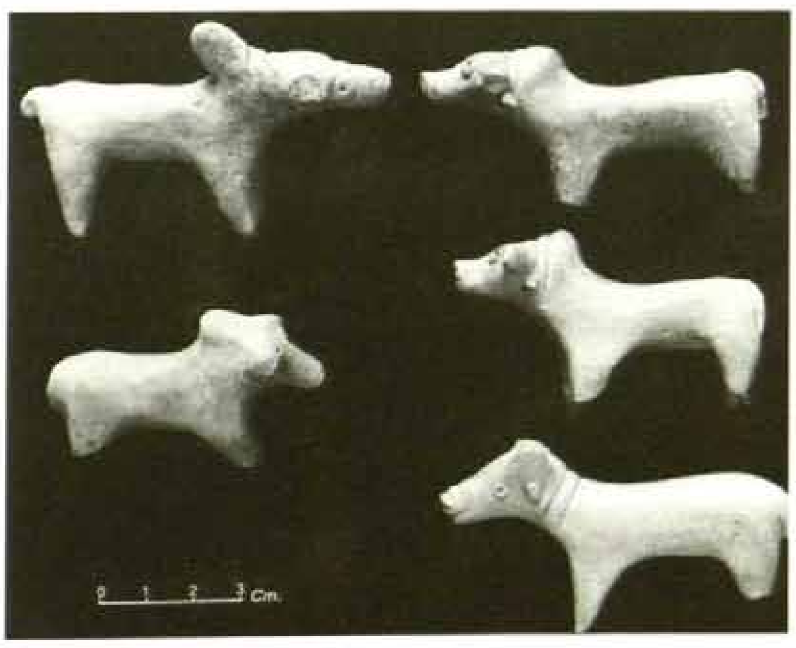
47

Rakhigarhi : 46, sealed copper vessel, Period II: 47, hoard of gold and silver ornaments, Peroid II

PLATESS 48-49



48



49

Rakhigarhi : 44, *measuring pans, Period II;* 45, *terracotta animal figurines, Period II*

JAMMU AND KASHMIR

21. EXCAVATION AT GURU BABA-KA-TIBBA, DISTRICT JAMMU

In continuation of the previous season's work, the Srinagar Circle of the Survey, under the direction of P.C. Chaudhari and Vijay Shankar, assisted by Sujeet Nayan, Samir Diwan, B.S. Jamwal, Raghubir Singh, R.R. Chaudhary, R.K. Kaul, V.K. Kaul and Arunji Sidha resumed the trial excavation at Guru Baba-Ka-Tibba in Marh block of District Jammu with the objective to establish the nature and sequence of cultural deposits and to understand the link between late Harappan and early historic cultures. Trial-excavation was carried out in two quadrants of 4.25 m each on the south side of the mound which revealed six metres of habitational deposit having seventeen different layers belonging to the following four distinctive periods- Period I-grey ware, Period II-early historical, Period III-Kushan and Period IV-medieval periods (fig. 15; pl. 50). A mud-brick wall was noticed belonging to the Period III (figs. 16-19; pl. 51). Antiquities and pottery recovered are similar to those found in the previous season's work. Terracotta beads and balls, shell bangles, copper, ivory and bone objects were also found.

22. EXPLORATION IN DISTRICT KATHUA

Samir Diwan of the Srinagar Circle of the Survey noticed the following antiquarian remains in Basohli tehsil.

Village	*Nature of remains*
Martha	Late medieval *baoli*
Sanhar	Late medieval 6ao///sculptures
Teerdi	Late medieval *baoli*
Thana	-do-
Tutthal	-do-

KARNATAKA

23. EXCAVATION AT HAMPI, DISTRICT BELLARY

Excavations were taken up towards north and north-east of the octagonal bath, nearly 500 m north-west of the eastern entrance of the citadel by K.P. Poonacha, assisted by T.M. Keshava, B.K. Unnithan and M.M. Hadpad, of the Banglore Circle of the Survey. In the 1800 sq m area taken up for excavations, a terraced structure in the east-

Fig. 15

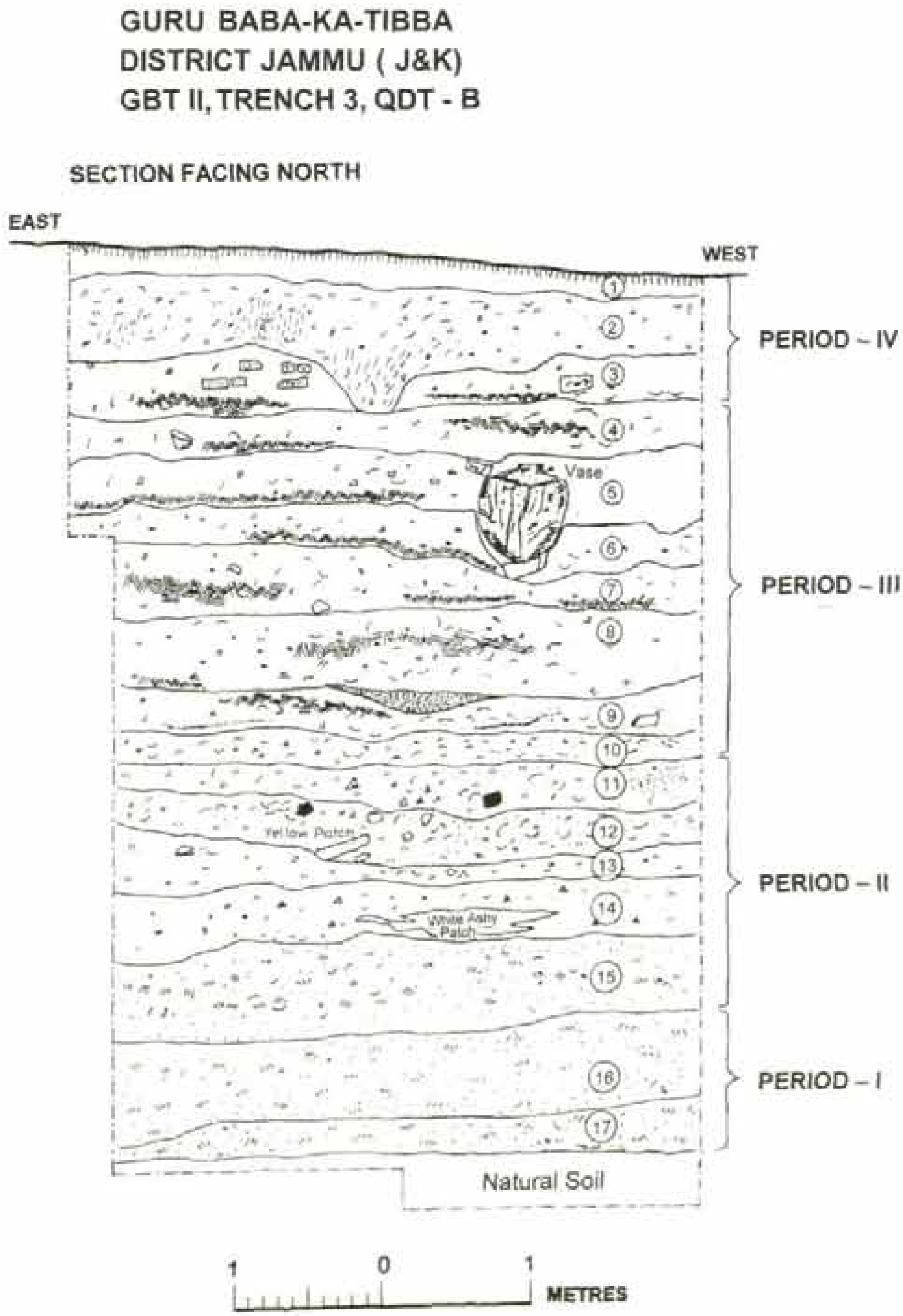
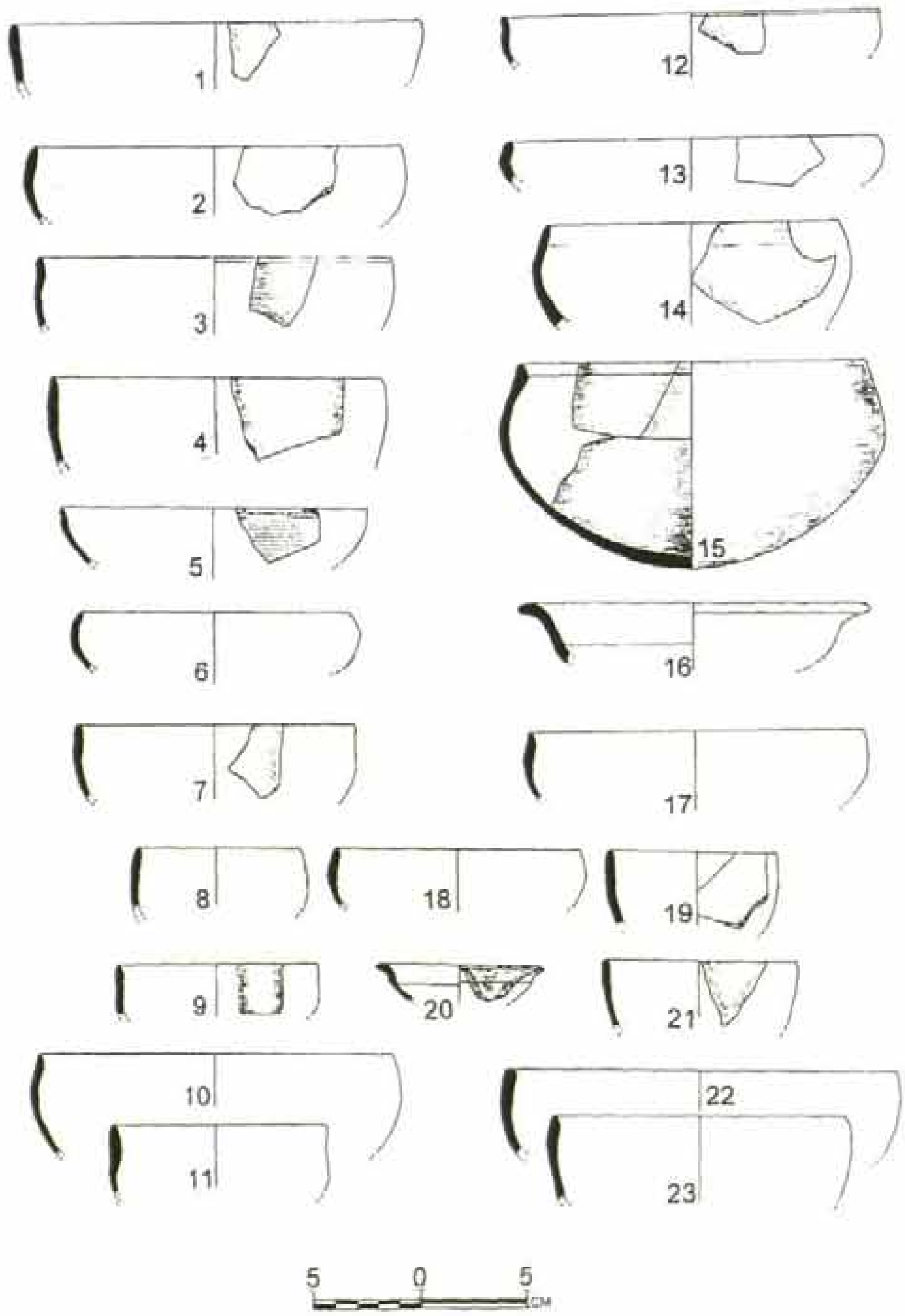
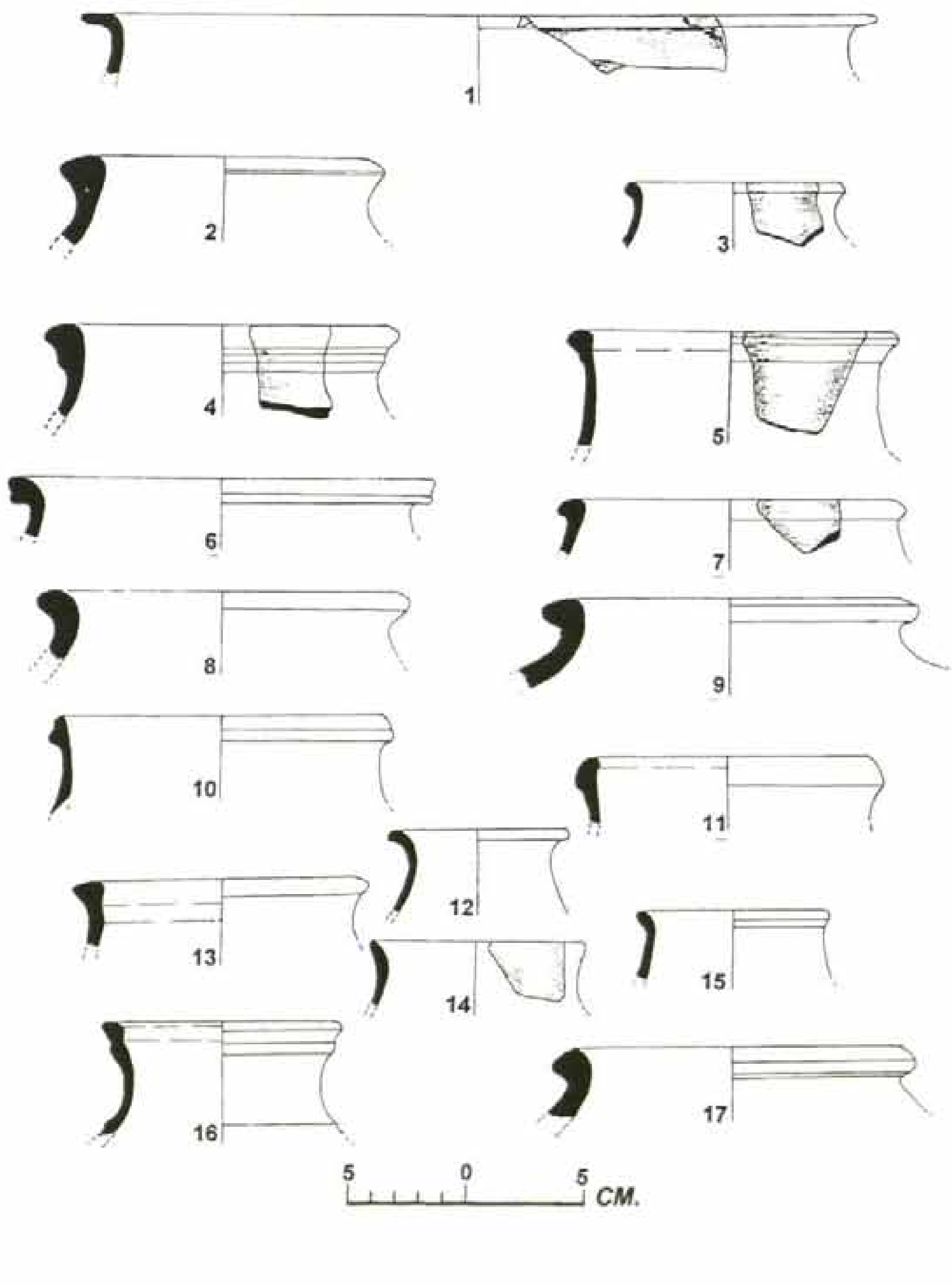

GURU BABA-KA-TIBBA
DISTRICT JAMMU (J&K)
GBT II, TRENCH 3, QDT - B
SECTION FACING NORTH
EAST
WEST
Vase
Yellow Patch
White Ashy Patch
Natural Soil
PERIOD – IV
PERIOD – III
PERIOD – II
PERIOD – I
1
0
1
METRES

Fig. 16



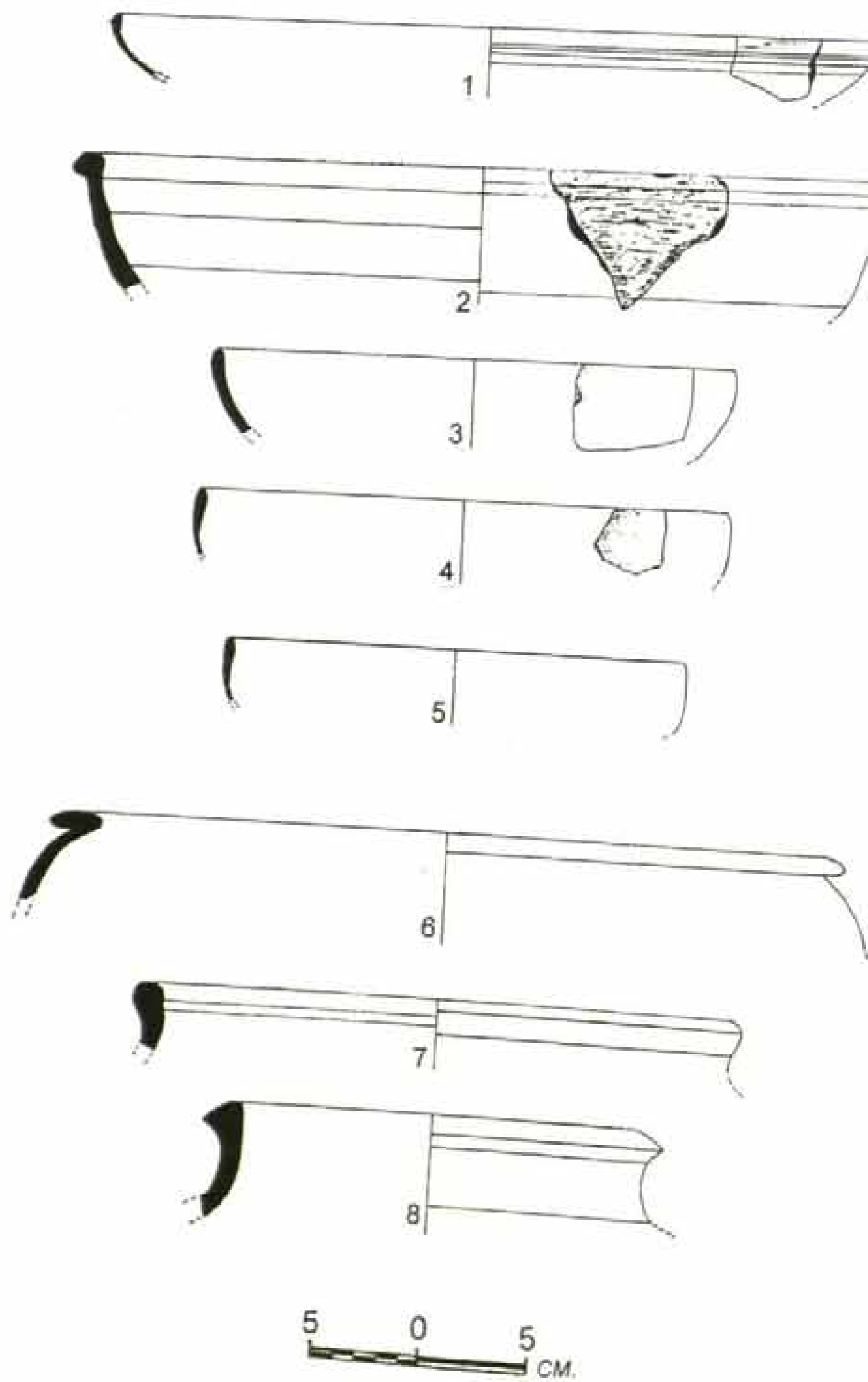
Guru Baba-ka-Tibba : red, grey and black ware pottery, Period I

Fig. 17



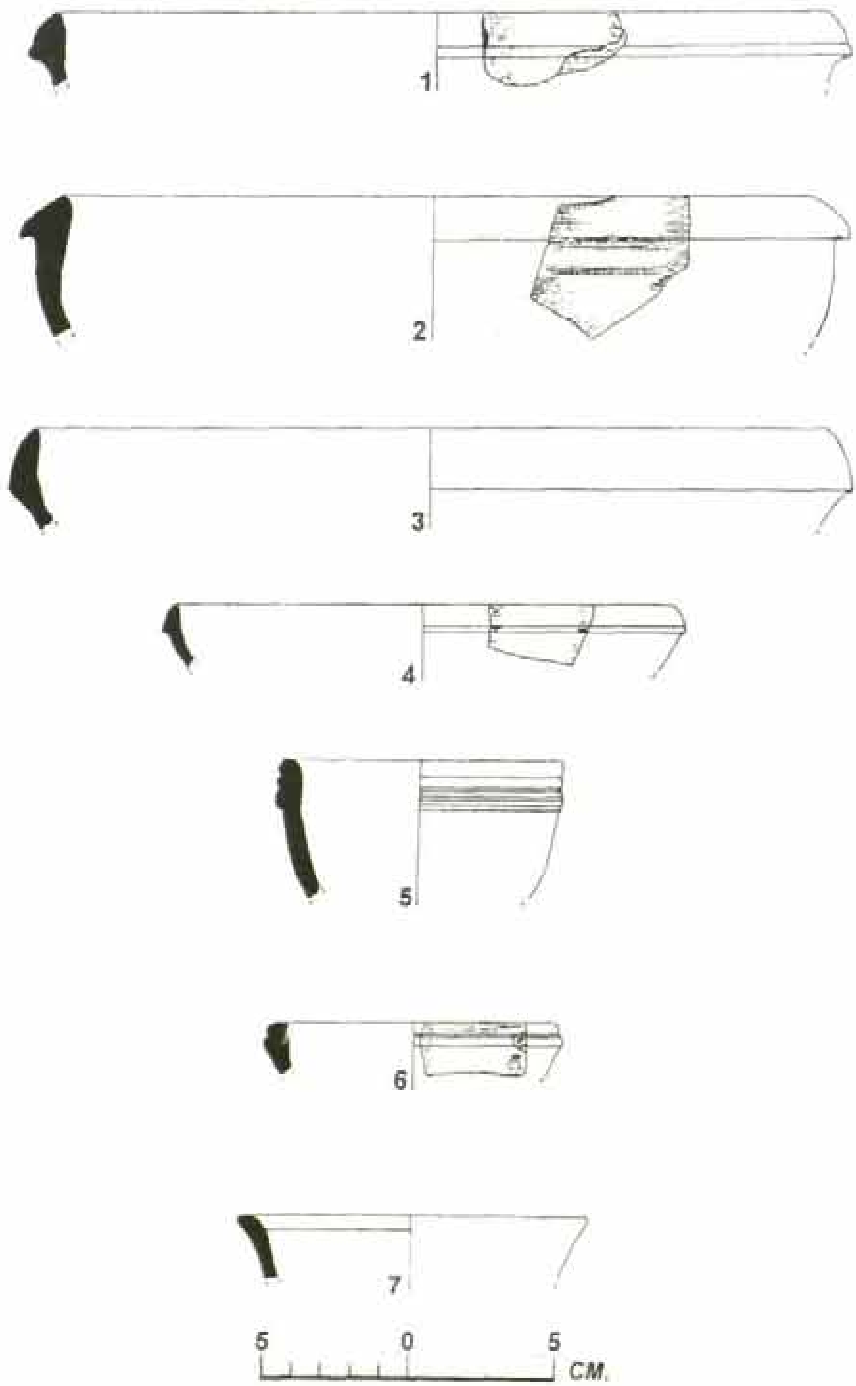
Guru Baba-ka-Tibba : red ware pottery, Period I

Fig. 18



Guru Baba-ka-Tibba : grey and red ware pottery, Period I

Fig. 19



Guru Baba-ka-Tibba : red ware pottery, Period I

PLATES 50-51



50



51

Guru Baba-Ka Tibba : 50, *circular pit with human bones and section facing west;* 51, *hearth and mud-brick wall, Period III*

west orientation extant to a height of 1.90 m running to a length of 38 m and width of 18 m (pls. 52 - 53) was found which was extensively damaged due to plundering as evidenced by the finding of burnt charcoal, loose ash, melted iron fasteners. The terraced structure is found to be treated with the usual conventional mouldings of *pada, adho-padma,* a short *kantha* and *urdhva-kumuda* mouldings at its facade and its side walls built in uncoursed rubble masonry in mud-plaster and finely treated with lime-plaster for the finish. However, the topmost terrace has, at its western end, three brick-built chambers, each with a wall having width of 0.45 m . Due to the disturbances in the mound, except the central chamber, the two northern and southern chambers were disturbed. The extant central chamber measured 2.20 sq m with its brick-built wall. The entrance door measured 90 cm in width. The excavation carried out towards the eastern side of this terraced structure revealed the open courtyard, running to a length of 48 m in north-south with a width of 16 m . Beyond this wall further to the east was the exterior courtyard measuring 80 x 20 m which has at its northeastern corner a guarded entrance with two guard chambers measuring 12 x 8 m. Further at its southern side this courtyard has a highly disturbed guarded entrance with a platform for the guard, built towards its inner side. This entrance opens into a large rectangular chamber abutting the southern screen-wall of the earlier referred terraced structure. This large rectangular hall might have served as horse stable for that structure.

The excavation, continued further towards the western side of the terraced structure revealed a passage with a width of 4.0 m . It runs in north-south orientation, to a distance of 60 m reaching the octagonal bath at south and takes a right angle turn towards west and opens into what probably is another courtyard for another terraced structure further west. The antiquities from the excavation comprise different types of iron fasteners in the form of flats, nails, clamps, etc., dull red and grey ware of utilitarian typology.

The preservation and restoration of excavated remains of the pillared Noblemen's quarters facing the palace basement of Krishnadevaraya in the Rangamahal complex, towards its south, has been completed as per the original plan and elevation. In addition, the screen-walls, the facade of the terraced structure near octagonal bath has also been restored by dismantling and resetting the disturbed *kumuda* moulding and properly levelling the courtyard and terraced structure.

The ceramic typology retrieved from the excavation revolve around the usual household utensils characteristic of the medieval period. Storage-jars, high necked collared spheroidal water pots, wide mouthed straight shouldered *lotas,* characteristic lids with collars form the utilitarian pottery in dull red and grey ware. The findings of China porcelain were reduced to a few sherds. The religious ware as encountered in the royal enclosure is conspicuous by its absence. Different types of iron nails of various size and shapes, clamps and hooks, melted and burnt were found at the site.

PLATES 52-53



52



53

Hampi : 52, general view of the site of terraced structure, before excavation; 53, terraced structure near octagonal bath, after excavation

24. Excavation at Isampur, District Gllbarga

K. Paddayya of the Deccan College Post-graduate and Research Institute, Pune undertook explorations and excavation at the Lower Palaeolithic (Acheulian) site of Isampur (30° 17'N; 76° 29'E) situated in Shorapur taluk. This site lies in a narrow, gorge-like valley enclosed by shale-limestone uplands. It forms part of the limestone floor of the valley covered with 1 to 2 m thick brown/black silt deposits of the Pleistocene period, which serve as excellent farmland. On account of soil quarrying and erosion some of the silt cover has been stripped away in recent times, thereby exposing to surface the Stone Age cultural material.

Locality II at Isampur is one such Stone Age site. The surface explorations and trial pits revealed that the site covers an area of three-quarters of a hectare (pl. 54). It consists partly of agricultural land and partly of grass and shrub-covered course of a shallow watercourse flowing across the farmland. At this spot only a thin cover of silt (20 to 60 cm) is left behind after soil quarrying and rainwater erosion. The geoarchaeological studies undertaken in the area revealed that there are four factors which favoured the location of the Stone Age site at this spot: a) plentiful on-the-spot availability of hard limestone blocks of various shapes and sizes suitable for the manufacture of tools; b) location of the site close to the outer edge of a palaeodrainage channel (subsequently filled up with 3 to 4 m thick silt deposit) which must have served as an assured source of water; c) plentiful supply of wild plant and animal foods both on the valley floor and on the surrounding uplands; and d) the basin-like topography of the area providing security and protection from both natural and human agencies.

In addition to surface studies, excavation was undertaken in the watercourse portion of the site covered with grass and shrubs. On account of partial erosion of silt deposit (which originally measured 1.5 m in thickness) covering the Acheulian level and its quarrying by the Irrigation Department over hundred artifacts were exposed on the surface. These comprised large cores, flakes, by-product flakes and chips of limestone and hammerstones of hard rocks like chert, basalt and quartzite. Two trenches (1 and 3) were excavated in this part of the site; these lay 12 m away from each other. The aim of this excavation was three-fold: a) to ascertain the stratigraphical position of the Acheulian level in relation to the sediments occurring in the area; b) to understand the depositional context of the cultural level from the point of view of site formation processes; and c) to recover organic materials useful for purposes of dating and environmental reconstruction.

In Trench 1, a small area of 3 nr was excavated as part of general explorations carried out in the previous field season. In the current season the area was enlarged and the trench measured 6 m x 4 m. For want of time, excavation had to be

PLATES 54-55



54



55

Isampur : 54, *general view of the site*; 55, *lower Palaeolithic site*

PLATES 56-57



56



57

Isampur : 56 and 57, *lower Palaeolithic site*

stopped at the 30 cm level (pls. 55-56). The following stratigraphy was exposed in the trench:

0-10/15 cm below surface	Black sticky clay (sterile)
10/15-20/25 cm below surface	Colluvial gravel lens in a matrix of brown silt and made up of angular to sub-angular pieces of Intertrappean chert and some Middle Palaeolithic artifacts of chert
20/25 - 30 cm below surface	Acheulian level consisting of fresh artifacts, limestone pieces and blocks set in a hard matrix *of kankary* brown silt

The artifacts found in the Acheulian level showed razor-sharp edges and fresh surfaces. Morever, most of them were found lying on their flat surfaces. These features, coupled with the presence of many cores and waste flakes, clearly show that the lithic material is in its primary context. The level yielded a total of over four hundred and sixty artifacts. In addition, it also produced a few fossilized pieces of tortoise shells and teeth/bone fragments of wild cattle.

Trench 3 (pl. 57) measured 7 x 6 m in size and formed part of the area where the upper portion of the silt deposit was dug away upto 55 cm below surface. In the northwestern part of the trench half-a-metre thick silt deposit was preserved. It measured only 20 to 30 cm in thickness in other parts of the trench. The following stratigraphy was observed in the trench:

0 - 20 cm below surface	Compact black silt without any cultural material
21 to 30 cm below surface	Black silt containing Intertrappean chert nodules and a few flake artifacts of Middle Palaeolithic type
31-35/40 cm	Sterile brownish silt
36/41-55 cm	Acheulian level found in a matrix of hard, brown *kankary* silt and resting on limestone surface

The Acheulian level was excavated as two digging units (35 to 45 cm and 45 to 55 cm levels). The horizon rested on limestone surface and consisted of limestone blocks of various sizes and artifacts, all set in a matrix of brown *kankary* silt and well cemented. It appears most likely that some amount of the brown silt was already present on the limestone surface and then the Stone Age occupation took place. From the positions of artifacts and limestone pieces and their orientations, it was clear that the horizon was affected by fluvial activity which caused intrasite reshuffling of some of the pieces and artifacts. A total of over four hundred and fifty artifacts were found in this level.

Based upon the results of field investigations described above, the following observations could be made about the Acheulian site at Isampur:

i) The Acheulian occupation took place on the limestone pediment surface. The site is preserved in its primary context, as is clearly proved by the fresh condition of the artifacts, their occurrence in flat positions and lack of any orientation in their long axes and the occurrence of artifactual material in various stages of manufacture.

ii) Isampur is a true quarry-cum-workshop site. Limestone served as the principal raw material. With the help of hammerstones of hard rocks like chert, basalt and quartzite, limestone blocks from the bedrock were shaped into cores and used for flake production. These flakes were in turn shaped into regular tools like knives, cleavers and handaxes. The lithic material including the small chips enables us to reconstruct the production sequence of artifacts.

iii) The main implement types include knives, handaxes and cleavers but their number is limited. The assemblage predominantly consists of cores in various stages of working, flakes and debitage pieces. It would seem that Isampur was a local centre for the supply of finished tools to nearby smaller places.

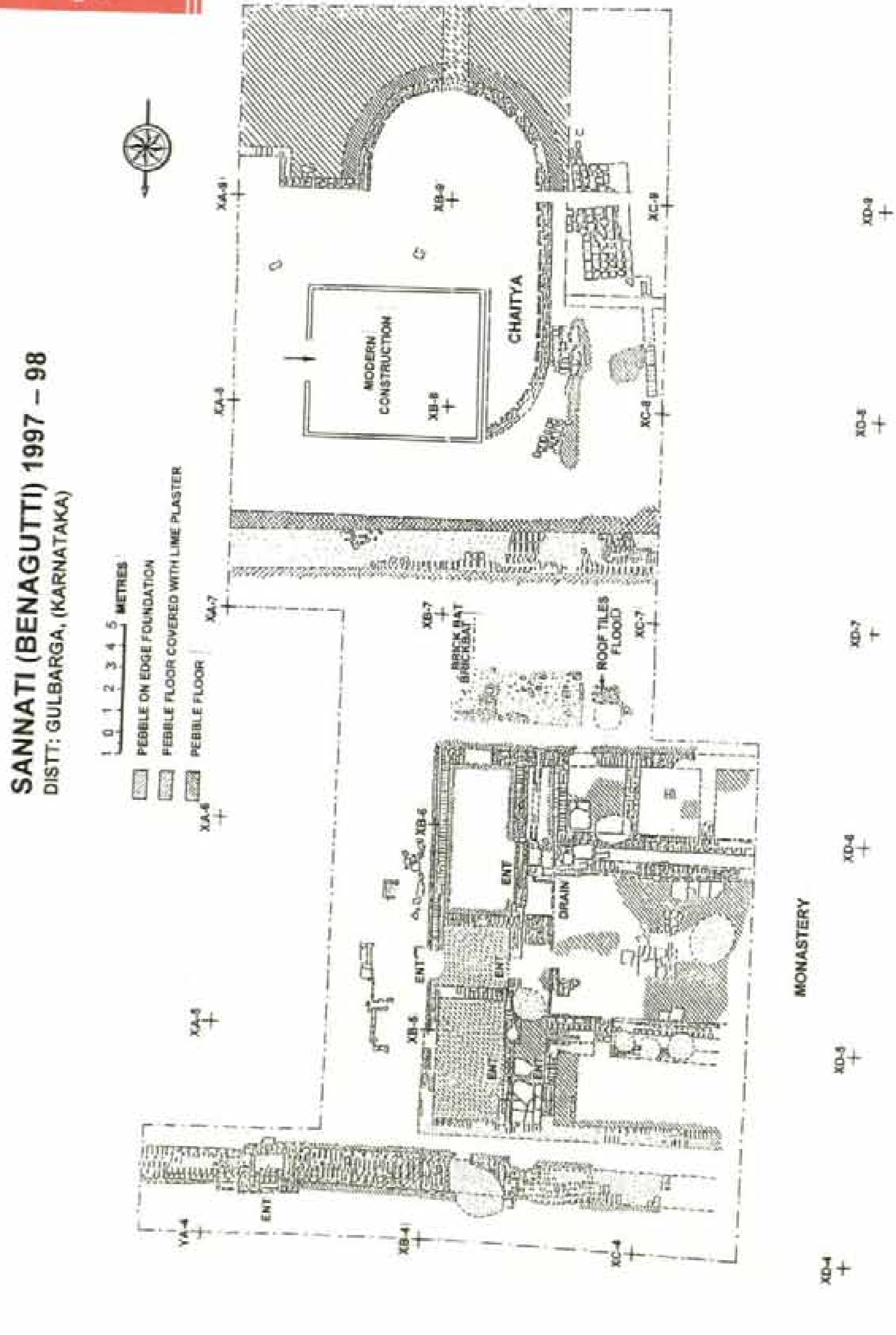
iv) The occurrence of wild cattle bones and teeth and tortoise shell pieces gives some hints about the hunting-gathering activities of the Acheulian group.

25. Excavation at Benagutti, Sannati, District Gulbarga

Excavation Branch-I, Nagpur, of the Survey, under the direction of K. Veerabhadra Rao, assisted by N.C. Prakash, C. Babjirao, N.K.S. Sharma, H.J. Barapatre, D.K. Kasbi, S.B. Suple, S.K. Gulrandhe, S.M. Khairkar, R.G. Nagulwar, A.E. Keshwar, D.K. Kamble, Shahid Akhtar, M.M. Dahake, M.G. Pendelwar, S.A. Raut, M.R. Kambe, R.G. Patil, M.Ramaiah, P.L. Junghare and P.C. Dhendwal conducted excavations at Benagutti mound, located to the north-west of Village Sannati on the left bank of River Bhima in the Chitapur taluk, to know the sequence of cultures and the chronology of the Buddhist structures.

The excavations have brought to light a single culture deposit (1.05 m) of Satavahana period (fig. 20). It consists of a large vihara-complex measuring 18.80 x 15.25 m enclosed by a massive compound wall built of bricks, remains of which are found on the northern and southern sides (pl. 58). An elliptical brick structure (16.40 x 8 m) located to the south of the *vihara* is worth mentioning for its

Fig. 20


SANNATI (BENAGUTTI) 1997 – 98
DISTT: GULBARGA, (KARNATAKA)
0 1 2 3 4 5 METRES
PEBBLE ON EDGE FOUNDATION
PEBBLE FLOOR COVERED WITH LIME PLASTER
PEBBLE FLOOR
MODERN CONSTRUCTION
CHAITYA
BRICK BAT
ROOF TILES
DRAIN
ENT
MONASTERY

PLATES 58-59



58



59

Benagutti : 58, general view of excavated site; 59, elliptical structure

architecture (pl. 59). The structure was raised over a bed of longitudinally placed schist pebbles with slots running up the wall along its inner periphery at regular intervals, indicating that wooden rafters were incorporated into the fabric of the wall for taking the load of the superstructure.

The vihara-complex comprises eight cells (7 x 3.4 m, 5.7 x 3.1 m, 4.6 x 2.6 m) and a large assembly hall of 10 x 8.6 m at the centre connected by a corridor of 18 x 1 m size running north-south (pl. 60). All the cells evidently have entrances connected to the corridor. The floor of the chambers is paved with longitudinal schist pebbles, which was subsequently plastered with lime mortar. The floor of the corridor and the main assembly hall were further covered with schist slabs. At a later date schist slabs were also used for veneering the western corridor.

Of the two boundary walls bordering the vihara complex, the one on the northern side is in a better state of preservation, measuring 24.6 m long with a maximum width of 1.55 m. It has an entrance in the form of a small chamber 2.7 x 9 m with provision for a door. The southern boundary wall is damaged and the available portion measuring 21 x 1.40 m with a height of 20 cm. The burnt bricks of the walls measure 46 x 24 x 7 cm and were laid above a bed of longitudinal schist pebbles. These were also used for paving pathways.

The elliptical brick structure *(chaityagriha)* measures 16.4 x 8 m and has a 4 m wide entrance on the eastern side. The superstructure is completely lost, but the extant foundation gives an idea of its architecture. Above a bed of schist pebbles there are sixteen to twenty four courses of bricks upto the ground level. The *chaitya* floor was raised upto plinth level by filling with black cotton soil to a maximum height of 1.36 m while on the exterior the pebble - rubble was used to raise the ground level around the *chaitya.* To the west of the *chaitya* at a distance of 1.3 m and below a depth of 1 m, a large brick platform measuring 3.35 x 2.65 m was also encountered. It was damaged due to undercutting of the river bank by flood waters. In both structures, the bricks normally measure 47 x 36 x 7 cm,

The antiquarian remains encountered here consist of a good number of sculptural fragments (pl. 61). Some of them bearing inscriptions in Brahmi characters of third century BC (pls. 62-63). Moulded terracotta figurines including those of kaolin, a variety of semiprecious beads made from chalcedony, agate, carnelian, crystal, faience and paste; objects of ivory and bone which include stylus, crochet needles, dice, glass bangles, terracotta plaques and copper objects including hairpins, antimony rods and necklace were found (pls. 64-67). More, than sixty coins of copper and lead datable to late Satavahana period were also found (pl. 68).

The ceramic evidence retrieved from the excavation includes red ware of medium fabric, burnished red ware, micaceous red ware, dull grey ware and a large variety of fine Red Polished Ware besides a solitary evidence of imitation variety of Rouletted Ware. The Red Polished Ware is represented by flasks of different types with globular body and a long narrow

PLATES 60-61



60



61

Benagutti : 60, vihara-complex; 61, head of a sculpture

PLATES 62-63



62



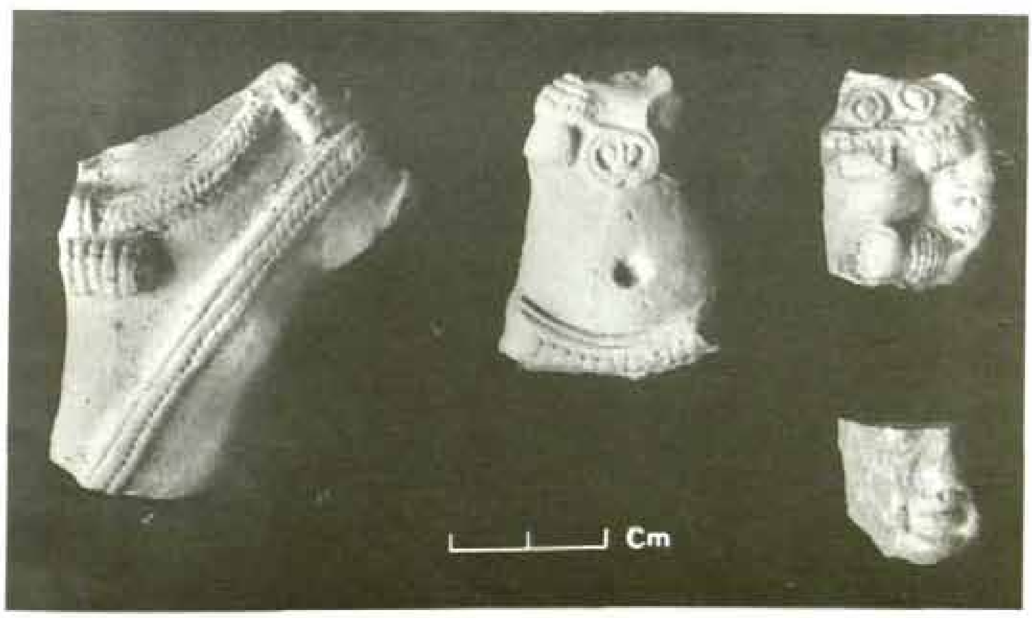
63

Benagutti : 62, Brahmi inscription of third century BC; 63, Brahmi inscription of second century BC

PLATES 64-65



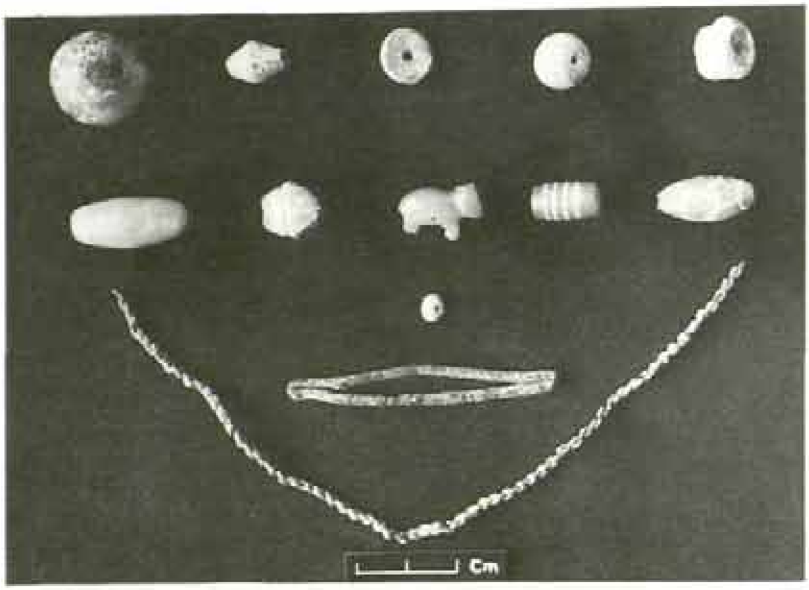
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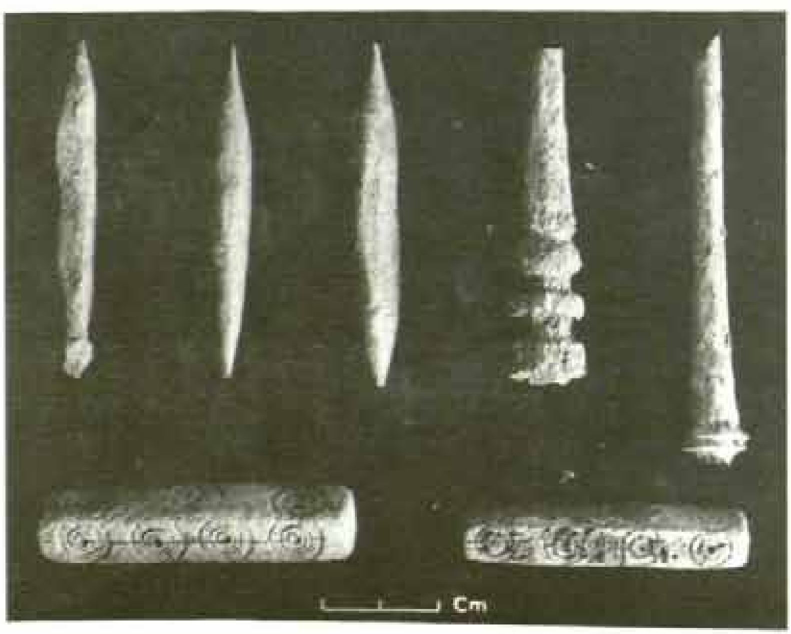
65

Benagutti : 64-65, *moulded terracotta figurines*

PLATES. 66-67



66



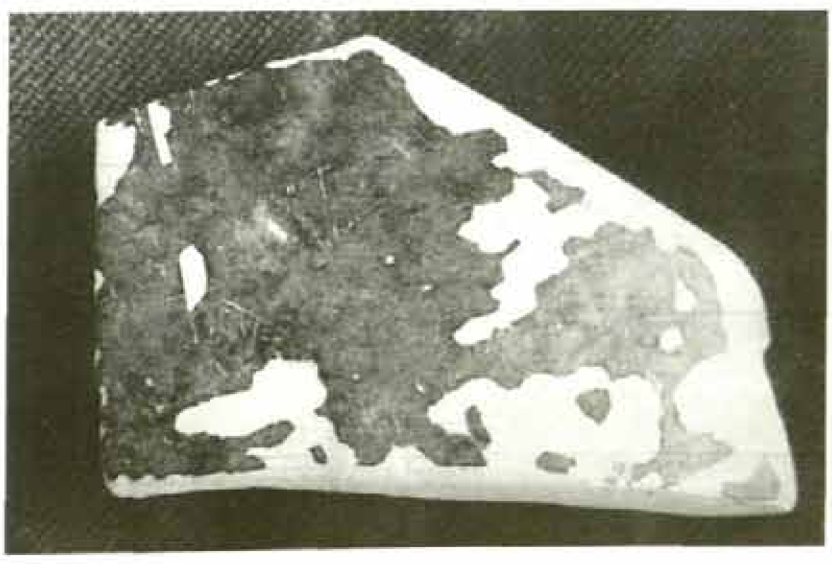
67

Benagutti : 66, semiprecious stone beads; 67, bone and ivory objects

PLATES. 68-69



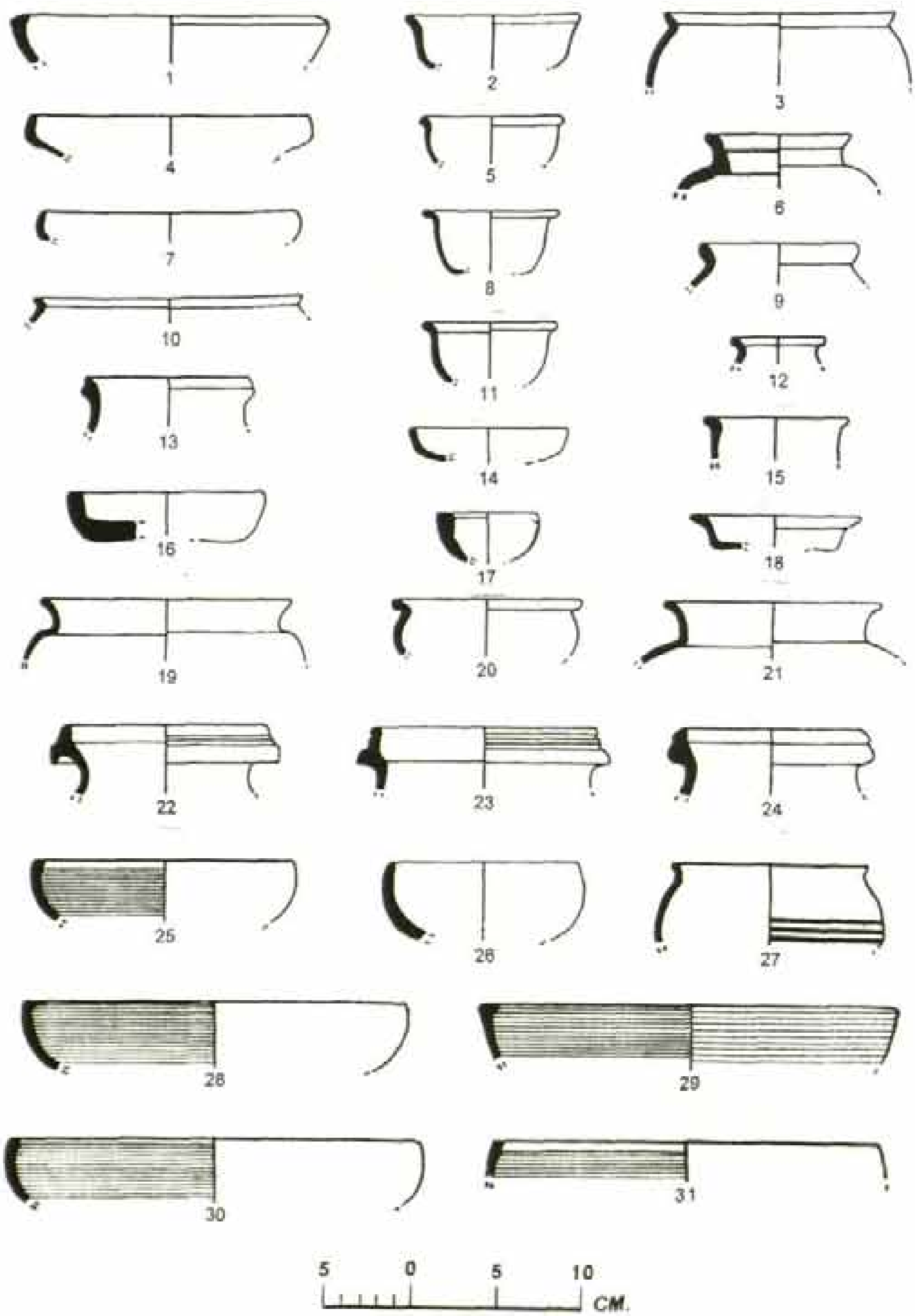
68



69

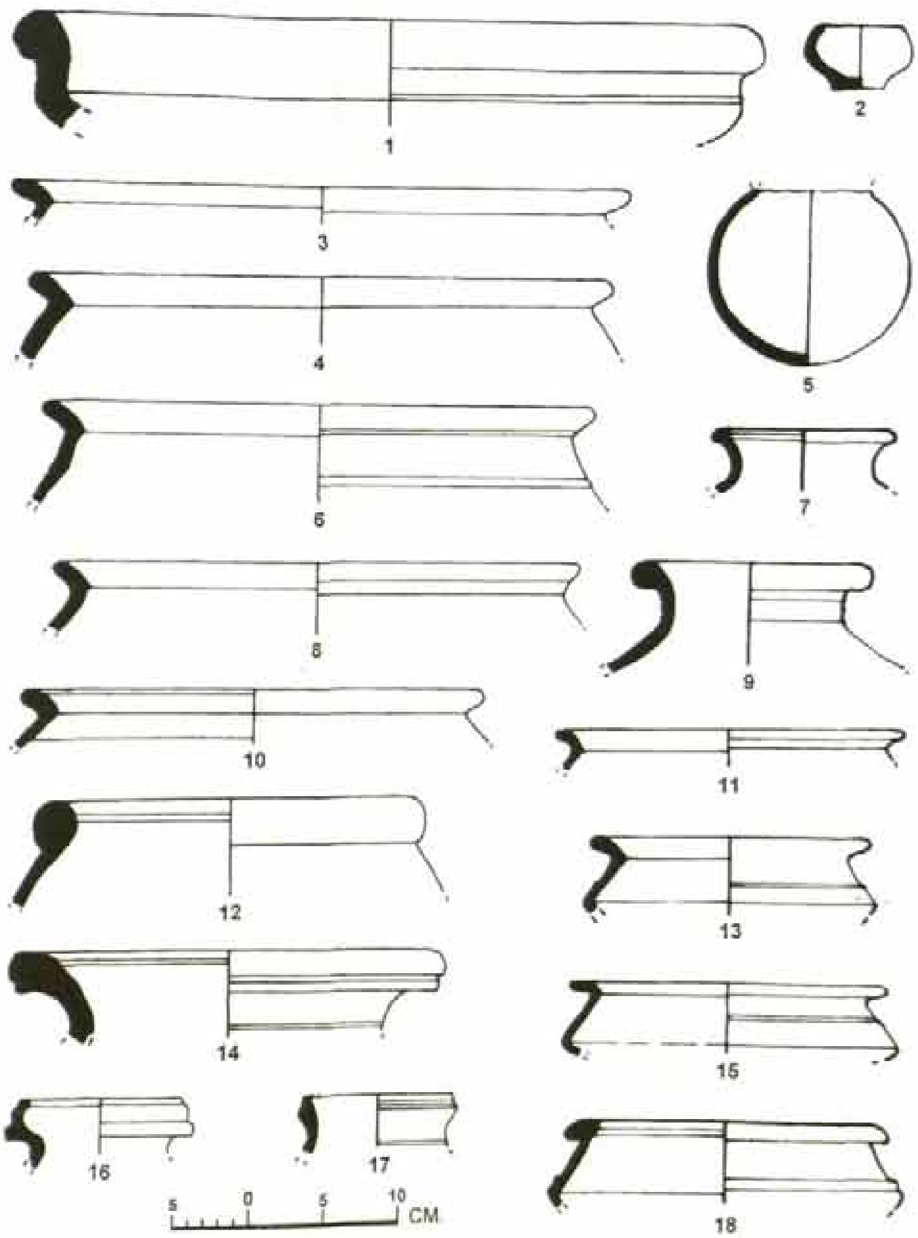
Benagutti : 68, Satavahana coins of lead; 69, sherd of NBPW

Fig. 21



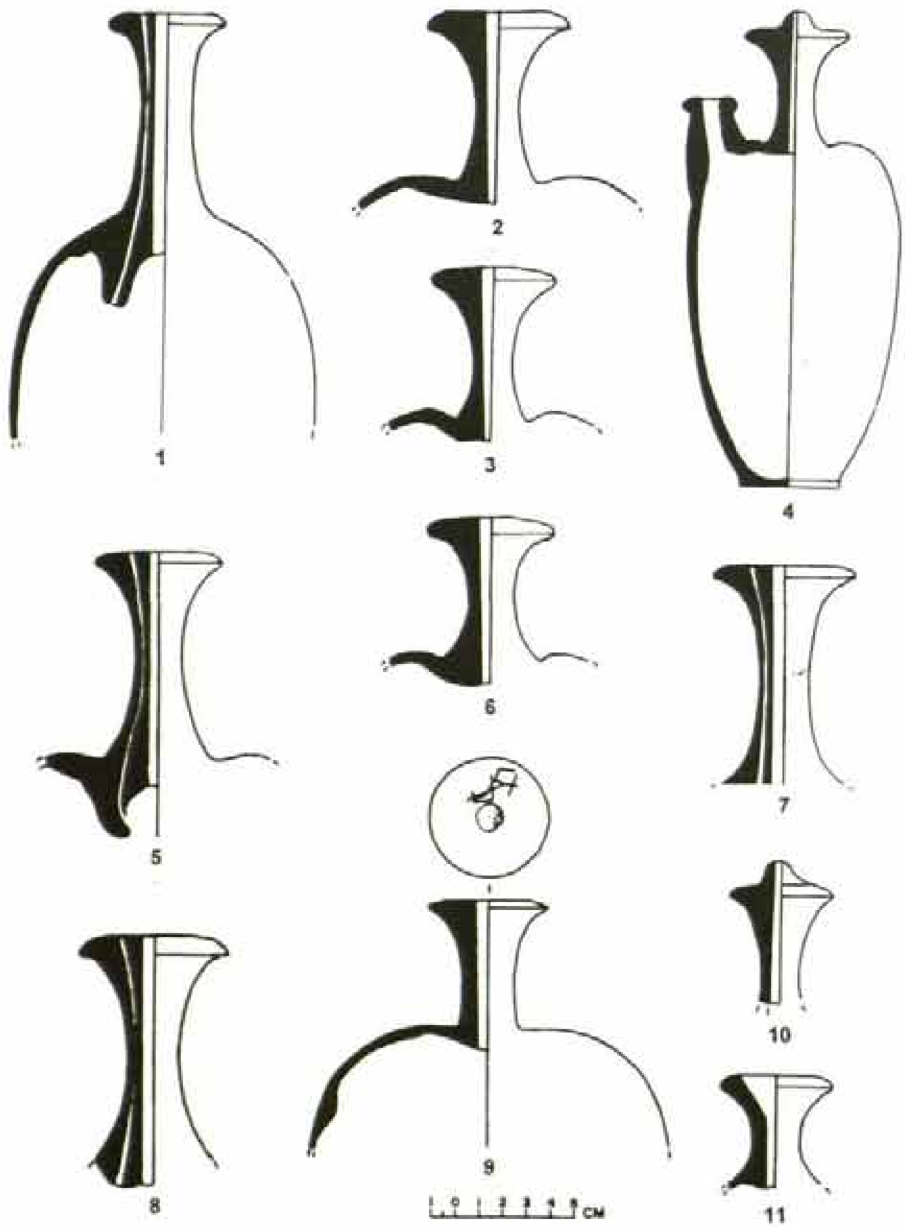
Sannati : Red Polished Ware & black-and-red ware bowls

Fig. 22



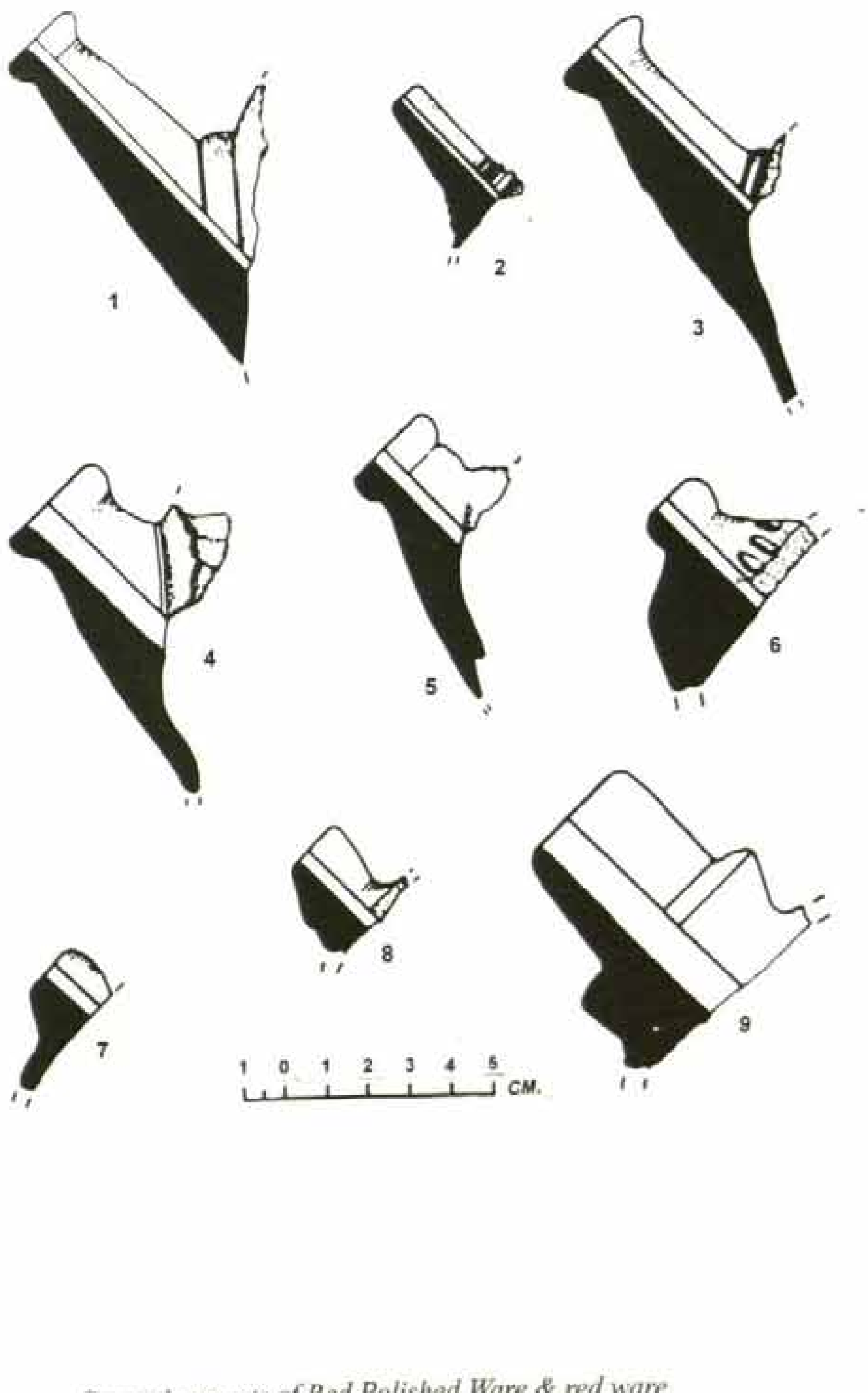
Sannati : red ware, basins & handis

Fig. 23



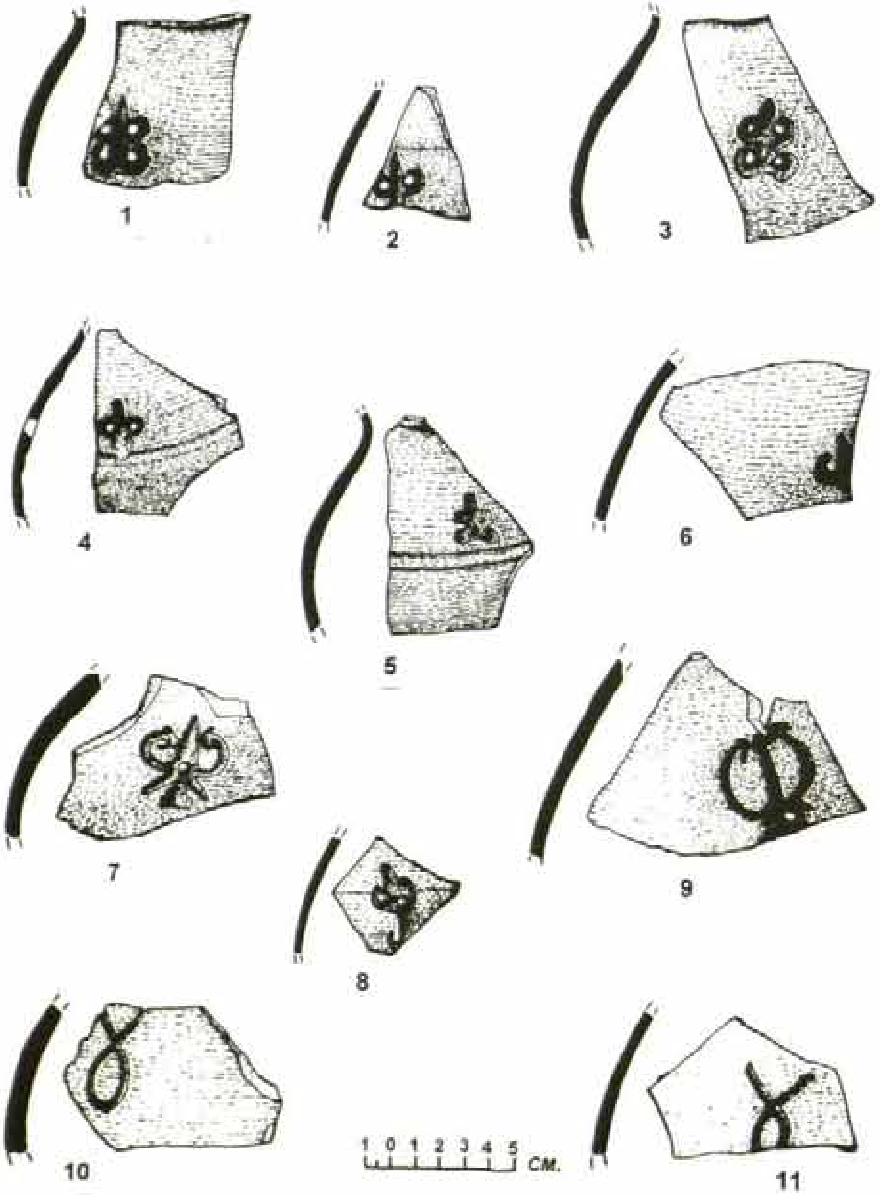
Sannati : Red Polished Ware, flasks

Fig. 24



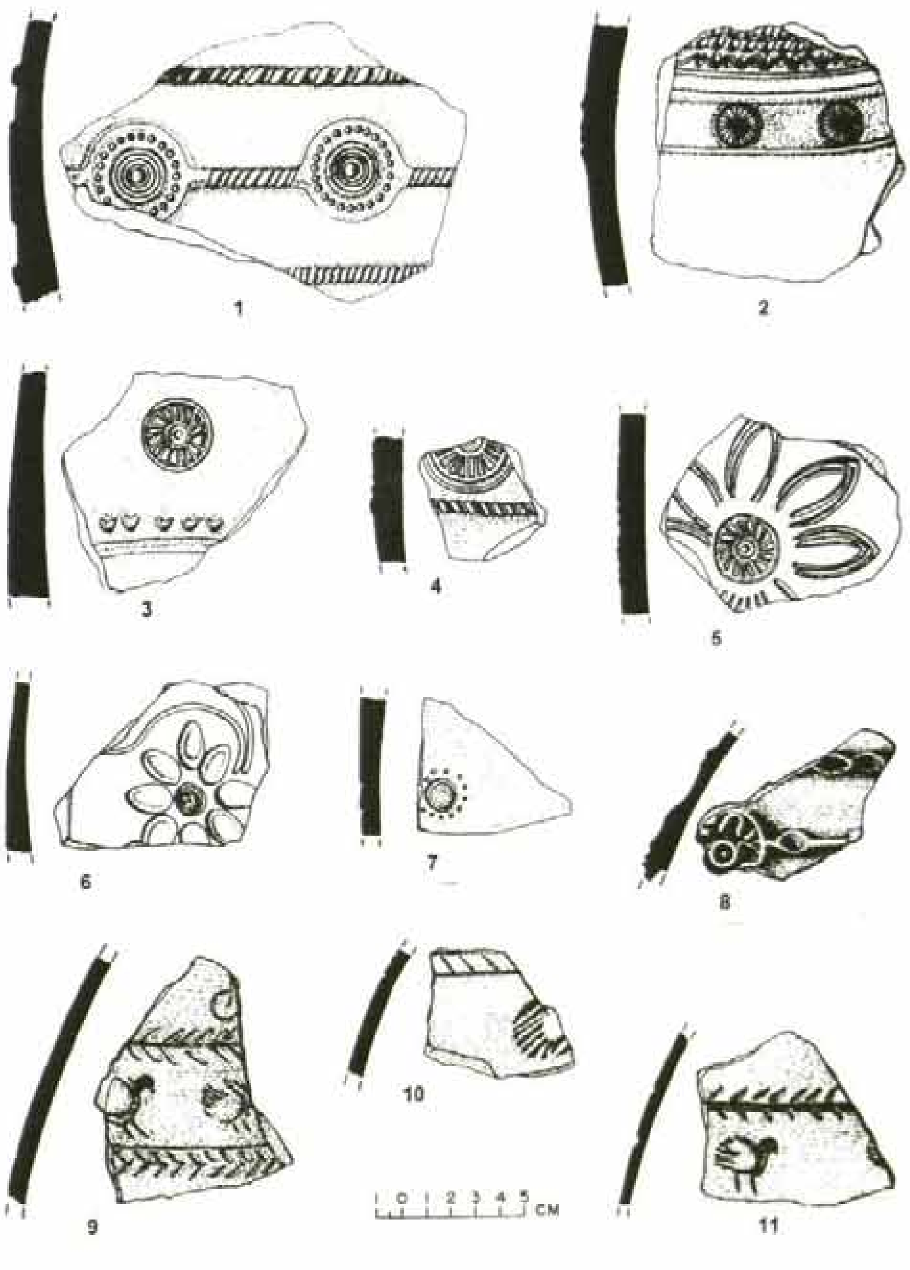
Sannati : spouts of Red Polished Ware & red ware

Fig. 25



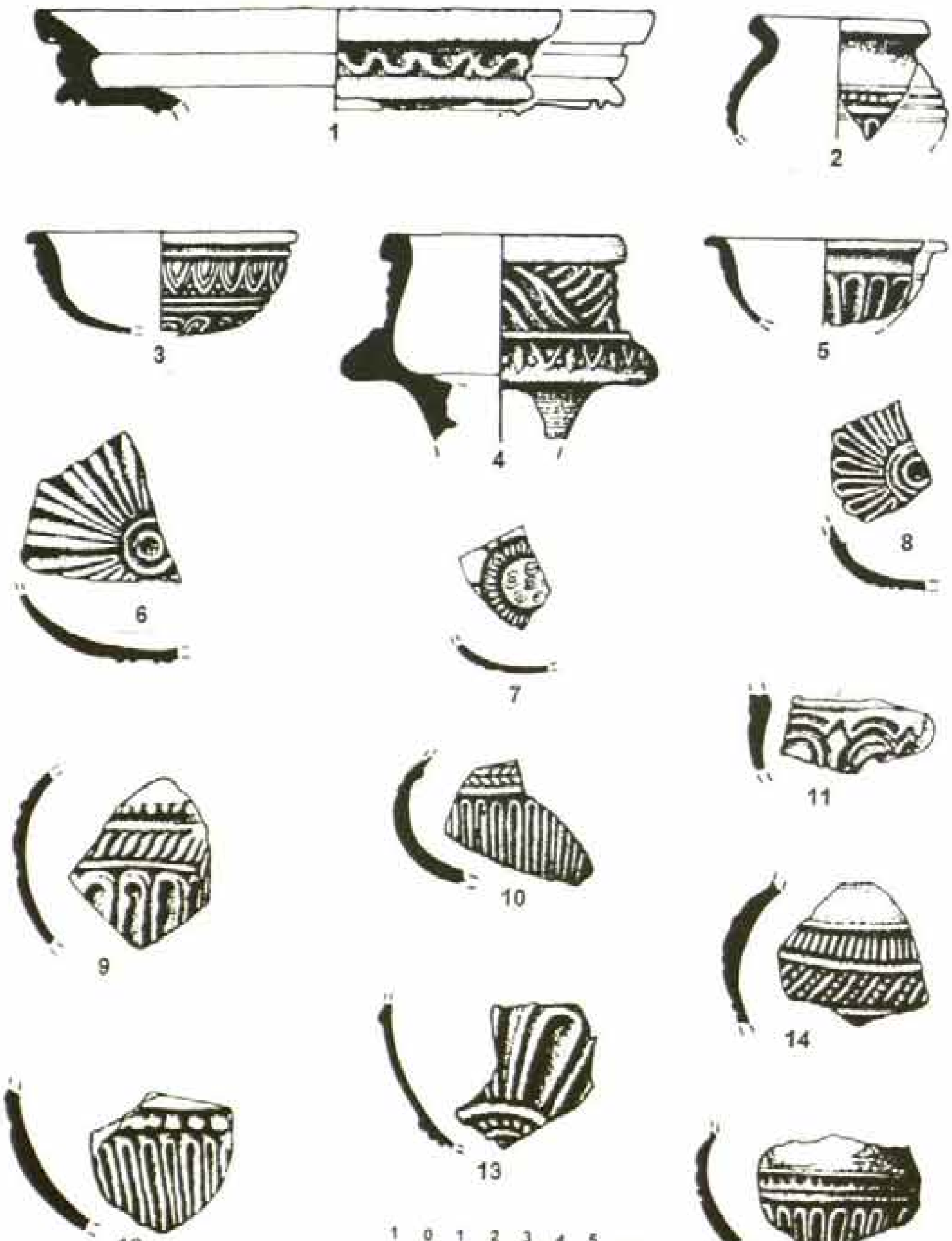
Sannati : stamped triratna symbols on pottery

Fig. 26



Sannati : stamped pottery with floral & bird motifs

Fig. 27



Sannati : moulded pottery of Satavahana period

neck with or without air vent hole on the rim. Bowls and dishes were also found in Red Polished Ware. The red ware consists of vessels of various sizes in shapes of globular pots, carinated *handis,* lid-cum-bowls, bowls and large storage vessels. A large number of conical bowls with a flat base found here was probably used by the monks *of vihara* (figs. 21 to 27). The collection also includes a single piece of Northern Black Polished Ware (NBPW) (pl. 69). The decorations are made by stamping, applique and cord impression. Among the stamped motifs were noticed different varieties *of triratna* symbols of which a unique, highly stylised *triratna* with two *makara/matsya mukhas,* floral and geometric designs is noteworthy. The applique designs were mostly confined to floral and finger pressed bands and cord impressions were restricted to loop designs.

The presence of a lone sherd of NBPW and a fragmentary inscription on a small stone trough pushed the date of the site to third century BC. From other fragmentary inscriptions, which were engraved in the characters of Ikshvaku Brahmi script, it is evident that the site was in use upto the third century AD.

26. Excavation at Kanaganahalli (Sannati), District Gulbarga

The excavation was resumed by the Bangalore Circle of the Survey, in continuation of the earlier work *(1996-97,* pp. 53-55), under the direction of K.P. Poonacha, assisted by T.M. Keshava, M.V. Visweswara, C.S. Seshadri, Sushanta Kumar Kar, M. Kalimuthu, Somla Naik, B.K. Unnithan and Megharaj Hadpad has brought to light the complete layout of the stupa proper in its plan and elevation.

Totally an area of 1500 sq m distributed in fifteen trenches beyond the railing (pl.70) of the stupa has been taken up for probe. The excavation has laid bare remnants of many accessory structures in the form of brick-built *chaityas* and votive stupas outside the periphery of the railing.

On the southeastern side, abutting the railing brick-built apsidal structure has been exposed. The apsidal structure extends upto a height of 1 m and has thirteen courses. The curvilinear profile of the apse is obtained by providing a small ledge of 1 to 1.5 cm in respect of every successive brick course. The structure measures 6 m in length and 4.55 m in width. The full size course is moulded in the shape *of adho-kumuda.* The core of the structure is filled with brickbats and earth.

Excavation at the south of the western entrance of the stupa has brought to light another circular brick structure built of burnt bricks. This structure has a diameter of 8 m and is extant upto a height of 38 cm in four courses. The periphery of the structure has a pavement to a width of 45 cm alround in rectangular limestone members. The topmost brick course is shaped like an *adho-kumuda* motif. The size of the brick is similar to the above mentioned structure.

Excavation in the area north-west of the western entrance has laid bare another brick-built rectangular structure (5.15 x 4.75 m). This structure (pl. 71), extant upto a height of 1.15 m, has been veneered with moulded limestone members on the eastern face. It has a *chandrasila* on the south. The foundation to all the brick structures encountered is provided with rubble mixed with gravel.

PLATES 70-71



70



71

Kanaganahalli : 70, ruins of railing and paved pradakshinapatha; 71, exposed brick structures

PLATE 72



Kanaganahalli : inscribed panel portraying king Asoka

During excavations many architectural members of the stupa-like fragments of sculptured veneering slabs, members of the railing, *chhatras,* pedestals, coping members, pillars, capitals, Buddha *padas,* sculpture of *yaksha* and four seated Buddhas were retrieved. Some of the sculptured veneering slabs which are in fragments when identified and joined together reveal that they depict symbolic representations of the Master like the stupa models, *simhasana, bodhi-vriksha* and *dharmachakra,* besides representations of the important monasteries as well as the *naga* king Muchilinda. These panels used for veneering the *vedika* stands to a height of 1.20 m and have a width of 1.20 m. Each panel is sculptured with a slender pilaster at the left border which is decorated with the relief sculptures of stupa, *bodhi* tree in railing, elegant sculptures of male devotees and female *chauri* bearers.

Some of these sculptured panels are inscribed in Brahmi characters of first to third century AD, recording the donations made by a variety of persons ranging from traders to a king, common man and a mendicant hailing from areas as far as Himalayas.

The *medhi* which rises over the *vedika* too has a veneering of sculptured panels having a height of 2.80 m and width of 1.20 m. A number of these veneering slabs broken into many fragments and spread outside were retrieved and joined.

It is observed that the veneering slabs of the *medhi* are carved in three registers. The themes opted for sculpturing include the major and minor events from the life of the Master, key events from the popular *Jatakas* and portraits of royalty. Key events of popular *Jataka* like *Vidura-Pandita-Jataka, Sutasoma-Jataka, Shaddanta-Jataka, Sanjiniya-Jataka, Suka-Jataka, Vesantara Jataka,* etc., are magnificently treated. They also have label inscriptions identifying *tine Jataka* depicted. Apart from *Jatakas,* select major events from the life of the Buddha which are vividly depicted include king Suddhodana and Maya in the royal court, birth of baby Siddhartha, *mahabhinishkramana,* Mara's futile attempt and retreat, enlightenment, first sermon, division of relics etc. The panels containing the portrait sculptures of important Kings of the Satavahanas like Sri Satakarni, Pulumavi, Simuka besides the Mauryan emperor Asoka (pl. 72), are of great significance. Many of them have a label inscription below identifying the personality portrayed.

KERALA

27. Excavation at Bekal Fort at Pallikkare, District Kasargod

The Thrissur Circle of the Survey, under the direction of T. Satyamurthy, assisted by Krishna, T. Samuel Joshuva, and A. Palanivel, undertook excavations at BekalFort(12° 23'N;75°2'E) which was originally constructed during Ikkery Nayak's period (sixteenth century AD)and was occupied by Hyder Ali,Tipu Sultan and later by the Britishers. There are many ancient remains of military and para military settlements inside the fort and during the year under review, the western part of the inner fortification was taken up for excavation. Many residential houses (pl. 73) planned in grid pattern were unearthed and streets running north-south and east-west were also exposed. Among the structures exposed noteworthy are the typical Nallukettu houses of anicent

PLATES 73-75



73



74



75

Bekal Fort : 73, *structural remains*; 74, *mint of Tipu Sultan*; 75, *gold ear ornaments*

PLATES 76-77



76



77

Ubharia : 76, general view; 77, cairn circles

Kerala. All of them were having central open courtyard with side aisles and inner verandahs forming inner-living rooms. There were steps from the street to reach the houses and the kitchen, and bathing room facilities were also provided inside the houses. Significant among the discovery is the unearthing of a mint or Huzur (pl. 74) of Tipu Sultan in Trench No. G 6 - G 8 (30 x 25 m). A series of ovens on the southeastern comer of the structure shows that they were used as a furnace to mint coins. More than one hundred and fifty copper ingots were encountered in the debris mixed with charcoal. One hundred coins belonging to Tipu Sultan's period were discovered. Among the antiquities unearthed, interesting is the copper die of coin of Tipu Sultan. Pieces of gold ear-rings (pl. 75) of Tipu's period were also unearthed.

MADHYA PRADESH

28. Exploration in District Betul

The Excavation Branch-I, Nagpur, of the Survey, under the direction of S.K. Mitra, assisted by Nandini Bhattacharya Sahu and R.K. Dwivedi, P.V. Janardhanan, P.S. Pashine and S.A. Raut explored near Multai and discovered the following sites.

Tehsil	*Village/Site*	*Nature of remains*
Multai	Khambara (Simjhira) (78° 12'N; 21° 49'E)	Middle Palaeolithic and Mesolithic tools
-do-	Ubhariya (78° 09'N; 21° 48'E)	Megalithic caim circles

The Ubhariya megaliths (pls. 76-77) consist of approximately fifty cairn circles, marked by with and without boulders arranged along the periphery. Amongst these, a single megalith is constructed over a high raised mud platform which is rare (pls. 78-79).

The Khambara, a prehistoric site is stretched on either side of the State Highway between Multai and Betul to a length of approximately 2.5 km in association with the geological formation of High Level Gravel.

29. Exploration in District Dhar

The Prehistory Branch, Nagpur, of the Survey, under the direction of S.B.Ota and Shivananda V., assisted by Nandini Bhattacharya, K.M. Girhe, N.K. Nimje, P.C. Dogra and T.B. Thapa resumed exploration in the submergence area of Sardar Sarovar Project and reported the discovery of the following sites/mounds in the region.

Tehsil	*Village/Site*	*Nature of remains*
Dharampuri	Balwara (75° 29' 47" NS; 22° 9' 56"EW)	Middle Palaeolithic

PLATES 78-79



78



79

Ubharia : 78, general view of circle on mud raised platform; 79, close view of circle

Tehsil	*Village/Site*	*Nature of remains*
Dharampuri	Beganda (75° 31' 8" NS; 22° 11' 29" EW)	Chalcolithic and Medieval
-do-	Dahewa-I (75° 31' 16"NS;22° 13'EW)	Medieval
-do-	Dahewa-II (75° 31' 25" NS; 22° 12' 43" EW)	Middle Palaeolithic
-do-	Dharmapure (22° 09' N;75°21' E)	Rock-cut caves of medieval period, Bharavi mata mandir assignable to eleventhth-twelfth century AD
-do-	Ekalra (22° 07' N;75° 18' E)	Historical
-do-	Golati (22° 09' N;75°23' E)	Early historical
-do-	Hatnavar (22° 08' N;75° 19' E)	Early historical
-do-	Khalghat (75° 27' 51" NS; 22° 9' 51" EW)	Historical
-do-	Kothra (22° 08' N; 75° 14' E)	Chalcolithic

Tehsil	*Village/Site*	*Nature of remains*
Dharampuri	Morghadi (75° 28'NS; 22° 9'56' 'EW)	Lower Palaeolithic
-do-	Pagra (22° 11' N;75° 19' E)	Lower Palaeolithic
-do-	Pipaldagarhi (22° 09' N;75°25' E)	Chalcolithithic site unknown as Ramgarh
-do-	Ratwa (22° 07' N;75°10' E)	Historical
-do-	Tawala (22° 09' N; 75° 14' E)	Early Medieval
-do-	Tawalai Khurd (22° 09' N;75°14' E)	Medieval
Maheshwar	Ezampura (75° 31' 16" NS; 22° 12' 51" EW)	Medieval
-do-	Jhirwi (75°32'NS;22°12'EW)	Early historical
-do-	Limbadi (75° 34' 82" NS; 22° 10' 27" EW)	Chalcolithic
-do-	Sahastradhara (75° 32' 47" NS; 22° 10' 5" EW)	Middle Palaeolithic (pl. 80)

30. Exploration at Kutwar, District Morena

In continuation of the last year's work *(1996-97* pp. 64-65), the Bhopal Circle of the Survey, under the direction of A.K. Sinha, assisted by Narayan Vyas, Manuel Joseph, O.B. Khobragade, K.K. Rai, Nitin Shrivastava and C.K. Bhanarkar resumed the excavations at KTR-3 and KTR-4 besides a new site in Garhi area (KTR-5) to confirm the results obtained last year (1996-97) and to know the details of the settlement pattern specially during black-and-red ware (Period I), PGW (Period II) and NBPW (Period III).

31. Exploration in District Raipur

The Excavation Branch-I. Nagpur, of the Survey, under the direction of S.K. Mitra, assisted by Ch. Babji Rao, R.K. Dwivedi, Ghyasuddin, P.S. Pashine and T.B. Thapa, explored the region mainly to ascertain the possibilities to undertake future excavation work. In the process, the team discovered the following sites.

Tehsil	*Village/Site*	***Nature of remains***
Dhamtari	Arod (81° 38' N; 20° 40' E)	Group of menhirs with cairn circles (pis. 81 - 82)
-do-	Bhawarmara (81° 38'N; 20° 41'E)	Group of menhirs
-do-	Lilar (81° 39'N; 20° 40'E)	Early historical red ware pottery and group of menhirs

The Bhawarmara site is located on the right bank of Janjhan *nala* and Lilar is located to the right of Nagindhar and Bhawarmara *nalas* culminating into Mahanadi.

32. Excavation at Sanchi, District Raisen

In continuation of the last year's work *(1996-97 p.* 65), the Bhopal Circle of the Survey, under the direction of A.K. Sinha assisted by Naryan Vyas, P.K. Mukherjee, Rekha Radhaballabhi, R.K. Shrivastava, Jagdish Prasad and C.K. Bhanarkar resumed the excavation work around Structure 8. The trenches were further laid beyond the monastic-complex exposed in 1996-97. It has brought to light the remains of two different monastic-complexes. The excavation also indicated that the structures belong to atleast three different phases which may roughly be bracketed between *circa* first century AD to third-fourth century AD. Quite interestingly from one of the trenches laid on extreme south an iron helmet and a

PLATES 80-82



80



81



82

Sahastradhara : 80, *Middle Palaeolithic tools; Arod* : 81, *general view showing menhirs;* 82, *menhirs*

javelin were discovered from one of the cells of the complex. A few Saka-Kshatrapa coins were also found apart from semiprecious stone and terracotta beads and wheels, iron implements, bone points etc.

Digging at Structure 8 was also resumed to know the details. It was confirmed that the platform was raised by constructing walls on all the four sides of semi-dressed stones and filling the space in-between with large sized boulders. A few NBPW sherds were also recovered from the filling.

33. Excavation at Satdhara, District Raisen

In continuation of the last year's work *(1996-97* p. 65), the Bhopal Circle of the Survey under the direction of A.K. Sinha, assisted by Narayan Vyas, P.K. Mukherjee, R.K. Shrivastava, Ramesh Thakur, A.K. Soni, C.K. Bhanarkar and Suneet Kumar Verma resumed the excavation work at Satdhara around Stupa 1. The excavations were carried out in the west and north-west of Stupa 1 to understand the details of the staircases and the working levels of the stupa besides east of the main stupa, close to the apsidal structures. The Stupas 2 and 3, group of stupas and apsidal temple on the south of Monastery 3 were excavated to lay bare the buried features of the structures.

34. Excavation at Amilkoni, District Rewa

Archaeological site of Amilkoni (25° 3' 0" N; 81 ° 40' 12 " E) is located in the revenue village of Amilkoni in Teonthar sub-division of District Rewa on the right bank of River Tons at a distance of 80 km north of Rewa and 10 km west of Chakghat. The imposing mound at the site (pl. 83) was explored in 1997. The exploration brought to light NBPW sherds along with the Kushan pottery, microliths, animal bones etc. The dimension of the mound indicated that it would have been the continuous habitation for a considerable time.

With a view to exposing the thickness of deposit and understanding the different cultures of the site, the Department of Ancient History, Culture and Archaeology, University of Allahabad, planned to excavate the site. The excavation was conducted by J.N. Pal, D.K. Shukla and M.C. Gupta, under the supervision of V.D. Misra, assisted by L.K. Tewari, Rajendra Prasad, V.K. Khattri and Sharad Suman. In all, four Trenches A-9, L-1, Z-5 and Z-6 were laid out.

Trench A-9 measuring 5 x 5 m has been excavated upto a depth of 60 cm. It was represented by three layers. Only NBPW and associated sherds were obtained from this trench. The available evidence suggested that as this trench was laid out at a lower level it yielded the basal deposit of the NBPW period. The overlying deposit, if any, was washed away.

Trench L-l measuring 5 x 5 m was excavated upto a depth of 5-20 m (pl. 84). This deposit was divisible into twenty layers and two cultures. Layers 9 to 21 with a thickness of 3.53 m yielded the sherds of NBPW, black-slipped ware, black-and-red ware and red ware. Some of the pieces of cord-

impressed pottery were also obtained. The types included different varieties of bowls, dishes, basins, medium sized vases, storage-jars, etc. A few painted NBPW sherds were also obtained. Antiquities like iron/copper objects, beads fashioned on semiprecious stones, and terracotta and animal bones were also obtained.

Burnt clay lumps with reed impressions encountered at Layers 7 and 8 with a thickness of 52 cm represented transitional character between NBPW ware and the Kushan pottery. Layers 6 to 1, with a thickness of 1.15 m, yielded typical Kushan pottery. Iron/copper objects, beads fashioned on semi-precious stones, terracotta objects and animal bones were also obtained. Brick floor was a characteristic feature of this period (pl. 85).

Two Trenches Z-5 and Z-6 measuring 5 x 2.5 m were exposed to a maximum depth of 3.91 m. Of these two trenches, Z-5 was exposed to a depth of 1.19 m divisible into six layers (1-6). This deposit was characterised by Kushan pottery (pl. 86), terracotta and iron objects.

Trench Z-6 with a maximum deposit of 2.72 m was divisible into twelve layers. Layers 7 and 8 with a thickness of .54 m exhibited a transitional character from NBPW to Kushan. Layers 9-18 with a thickness of 2.18 m characterised the NBPW deposit. From the NBPW phase sherds of NBPW, black-and-red ware, black-slipped ware, plain grey ware and red ware were obtained. Iron/copper objects, beads fashioned on semiprecious stones and terracotta, bone objects, animal bones etc. were among the other antiquities. Burnt clay lumps suggesting existence of daub and wattle structures. The occurrence of iron objects as well as iron slags from the excavation indicated that the iron tools were manufactured in this area. Interestingly enough a human burial (pl. 83) was also exposed from the lowermost horizon from the NBPW phase.

Excavation at Amilkoni thus exposed cultural level from mid NBPW phase to Kushan period. The excavation revealed that there is no break between NBPW and Kushan period indicating thereby the continuation of NBPW phase in this area over a considerable length of time. Secondly, the Kushan period at this site was characterised by both extensive and intensive brick structures. Brick floored rooms were also exposed in the Kushan period at the site, the same structural sophistication was visible as was the case with other Kushan sites in the Ganga valley.

In the light of evidence available so far, the antiquity of human settlement at the site may be traced back to the fifth century BC and it continued without interruption upto the second-third century AD.

35. Exploration in the Tons Valley, Districts Rewa (Madhya Pradesh) and Allahabad (Uttar Pradesh)

Archaeological explorations have been conducted by V.D. Misra, J.N. Pal, B.B. Misra, U.C. Chattopadhyaya, D.K. Shukla and M.C. Gupta of the Department of Ancient History, Culture

PLATES 83-84



83



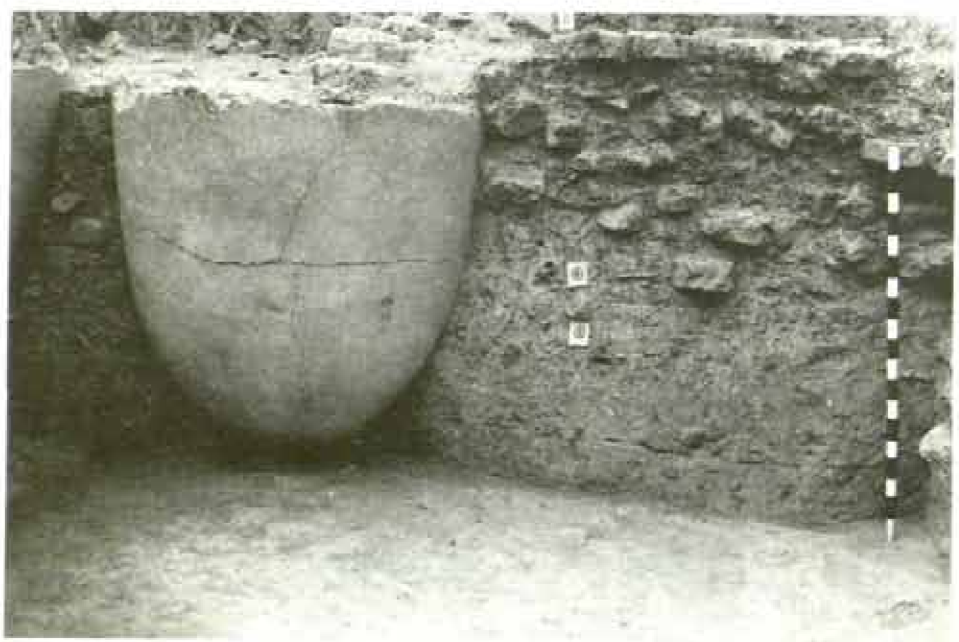
84

Amilkoni : 83, *general view of the site;* 84, *general view of exposed trench*

PLATES 85-86



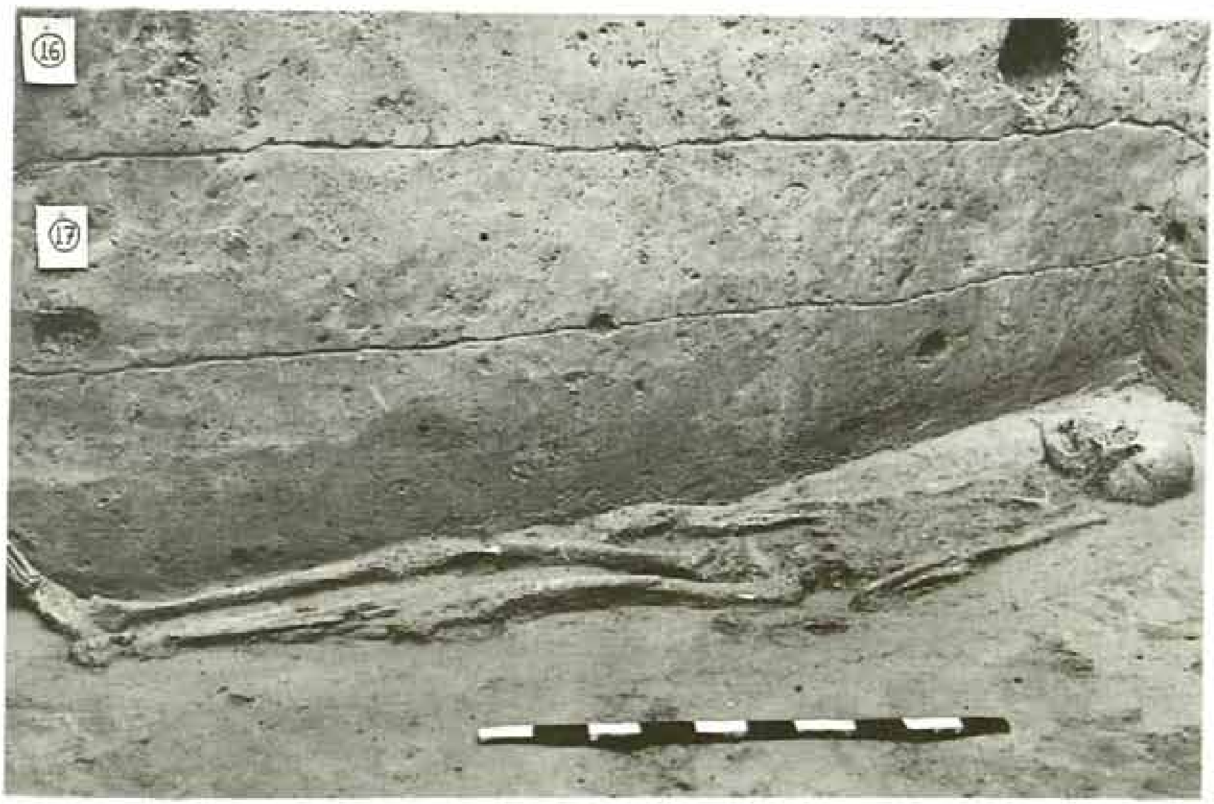
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86

Amilkoni : 85, paved floor of burnt brick; 86, storage-jar, Kushan period

PLATE 87



Amilkoni : human skeleton, NBPW period

and Archaeology, University of Allahabad, in the Tons valley. The explored area includes Teonthar sub-division of District Rewa of Madhya Pradesh and Bara sub-division of District Allahabad of Uttar Pradesh. The extensive exploration was carried out in 300 sq km area. These sites are located between the area lying between Sohagighat in the east and Teonthar in the west. As many as thirty-five sites of different cultures have been explored. The exploration brought to light several sites ranging from Palaeolithic to Iron Age cultures. The result of the exploration is given below:

District	***Sub-division***	***Site***	***Nature of remains***
Palaeolithic sites			
Rewa	Teonthar	Sahijawar-1	Lower Palaeolithic cleavers and scrapers made on sandstone and quartzite
-do-	-do-	Sohagighat (Kharari Nala)	Cleaver, flakes, scrapers fashioned mostly on sandstone and a few on quartzite. A few Middle Palaeolithic tools fashioned on quartzite. An evolved handaxe was also obtained
Mesolithic sites			
Rewa	Teonthar	Bhageligaon	Microliths made on chert, chalcedony, agate and carnelian
-do-	-do-	Dandi on Sohagighat	Core, core fragment, flakes, flake fragments, (West of Talab) blade, blade fragments fashioned on agate, chert, chalcedony and quartz
-do-	-do-	Sahijawar-2	Microliths made on chert, chalcedony, agate and carnelian, core, core fragments, flakes, flake fragments, blades, blade fragments and tools

District	*Sub-division*	*Site*	*Nature of remains*
Rewa	Teonthar	Sohagi Pahar Ka Talab	To the south of Sahijawar the site is located on the hill. Fluted core, chert, chalcedony, carnelian, quartz, cherty material predominate
-do-	-do-	Tulsipurwa	Microliths made on chert, chalcedony, agate and carnelian, core, core fragments, flakes, flake fragments, chunk, shaped tools include retouched blades, backed-blades, etc
Neolithic sites			
Rewa	-do-	Babupur-1	On the Kharari *nala* near Babupur village the site yielded triangular neolithic celt and Kotia type pottery
Chalcolithic sites			
Rewa	-do-	Malpar-1	Microliths, black-and-red ware of chalcolithic fabric, black-slipped ware with incised design
NBPW culture sites			
Rewa	Teonthar	Anjora-1	Red Ware, orange chocolate colour bowl, dishes, storage-jars and NBPW sherds
-do-	-do-	Chak	Early NBPW sherds
-do-	-do-	Deopa Chanda	NBPW bowl with everted rim, associated pottery and animal bones

District	*Sub-division*	*Site*	*Nature of remains*
Rewa	Teonthar	Malpar-2	Black-and-red ware of chalcolithic culture, brickbats, storage-jars, *karahi* of late NBPW phase, iron slags, red ware, storage-jars, knife-edged bowl, microliths, gamesman, pottery disc, stone discs, terracotta bangle, animal bones, potsherds ranging from mid-NBPW to Kushan period
-do-	-do-	Rajapur	Early NBPW assemblage and some Kotia type pottery, miniature vase with globular profile
-do-	-do-	Subhanath	NBPW sherds, post firing incised potsherds and Kotia pottery
-do-	-do-	Tikuri	Red ware storage-jar, lipped-bowl, basin, medium-sized jar, black-and-red ware bowl, NBPW sherds of dish and bowl, stone and pottery disc, chert/chalcedony pieces, iron slag
Kotia culture sites			
Rewa	Teonthar	Anjora-2	Red ware, thick grey ware and Kotia type pottery, carinated *handi* with multi-grooved rim, medium-sized vases and spout
-do-	-do-	Babupur-2	Red ware, grey ware, bowl, medium-sized vases and carinated *handis*

District	*Sub-division*	*Site*	*Nature of remains*
Rewa	Teonthar	Bagheri	Kotia type pottery, red ware, grey ware (both plain and slipped), *handi,* jar and basin
-do-	-do-	Baragaon	Kotia type pottery
-do-	-do-	Dabaha	Kotia pottery, red ware, grey ware (slipped and plain)
-do-	-do-	Dih	Thick grey ware, Kotia type pottery
-do-	-do-	Koni	Kotia type pottery, thick grey ware, thick red ware, thin grey and black-slipped ware pots
-do-	-do-	Koni-Baran	Kotia type pottery
-do-	-do-	Mallahan Tola	Kotia type pottery
-do-	-do-	Malpar-3	Medium-sized jars, carinated *handis,* spouted vessels and thick red ware
-do-	-do-	Nastganwan	Kotia type pottery
-do-	-do-	Panasi	Beads, hammer stone/cum-muller, Kotia type pottery

District	*Sub-division*	*Site*	*Nature of remains*
Rewa	Teonthar	Pandari Andar	Kotia type pottery, microliths, (lunate of early phase), carinated *handi,* basin, medium-sized bowl, medium-sized vases and *handi* in the red ware
-do-	-do-	Pandiwar	Kotia type pottery
-do-	-do-	Tonk	Kotia type pottery
Allahabad	Bara	Itara	Kotia type assemblage
-do-	-do-	Lonipur	Kotia type pottery, carinated *handi, jar* in thick grey ware and red ware
-do-	-do-	Naurdhia	Kotia type pottery, red ware, grey ware (both plain and slipped), jar, *handi,* basin, medium-sized vases and trough etc.
-do-	-do-	Singhpur	Kotia type pottery, red ware, storage-jar with wide mouth.

36. Excavation at Eran, District Sagar

VD. Jha assisted by K.K. Tripathi and P.K. Shukla of the Department of Ancient Indian History, Culture and Archaeology, H.S. Gour University, Sagar conducted excavation at Eran.

A Trench ERN 6 measuring 8 x 8 m was taken on the main mound to determine the chronology of prehistoric cultures, to investigate the deposition of Neolithic culture and to confirm the results of previous excavations.

The result of earlier excavation was confirmed. It has been observed that Ahar culture preceded Kayatha culture. In all, four cultural periods have been recognised.

The ceramic industry of Period I (a) include painted black-and-red ware, coarse black ware,

Malwa ware, grey ware, black-and-grey ware, tan ware, white-slipped ware and a few sherds of buff ware. The cultural material include terracotta bull figurines, discs—both perforated and unperforated, bangle and marble; beads of stone, terracotta and paste; sling ball, pestle, marble and broken bracelet, blade and waste products of stone; bone points and shell bangles.

Two structural phases have been noticed. The rammed floors are made of yellow or black clay mixed with potsherds and terracotta nodules. Huts were made of wattle and daub.

Period I (b) is marked by the complete absence of painted black-and-red-ware, white-slipped ware, coarse black ware and introduction of Kayatha ware, lustrous red ware and black shining ware. It has three structural phases. The associated wares are grey, Malwa, plain black-and-red and coarse red.

The rammed floor of black clay contains charcoal, potsherds and bone. Pestle and querns, beads, sling ball, marble, stopper, parallel-sided blades and waste products of stone; figurine of Mother Goddess, bull, earstud, bead, bangle in terracotta, shell bangle, bone point, copper rod were found.

The Period II ranging from 700 BC to first century AD has been marked by the introduction of iron, burnt brick structure, black burnished ware and punch marked coin. The Malwa ware, grey ware and chalcolithic black-and-red ware have not been met with. The black-and-red ware of this period is different in shape and fabric from that of the proceeding period.

Three structural phases have been encountered. The houses were made of burnt brick and rammed floor of clay.

Arrow-head, nail, broken spear-head of iron and copper objects, punch marked coins; disc, marble, gamesman, earstud, toycart wheel, skin rubber, bangle, marble and bull figurine of terracotta; pestle, quern, sling ball, miniature pot of stone; shell bangles; beads of shell, stone and terracotta have been unearthed.

The Period III bracketed between second century AD to sixth century AD is characterised by the introduction of red polished and other associated wares. NBPW is completely absent. Three structural phases have been noticed. Household objects of terracotta, iron, stone, shell and glass have been unearthed. The evidence of devastation by fire at the end of this period has been met with. The site was abandoned by the close of sixth century AD.

In Period IV the site was reoccupied during the fourteenth century AD. Structures of stone and burnt bricks have been noticed. The cultural material of late medieval period include nail and knife of iron; bead and marble of terracotta; sling ball, quern and pestle of stone. The period came to an end by the close of eighteenth century AD.

37. Explorations in District West Nimar

Shivanand V. under the direction of S.B.Ota, of the Pre-history Branch, Nagpur, of the Survey, during

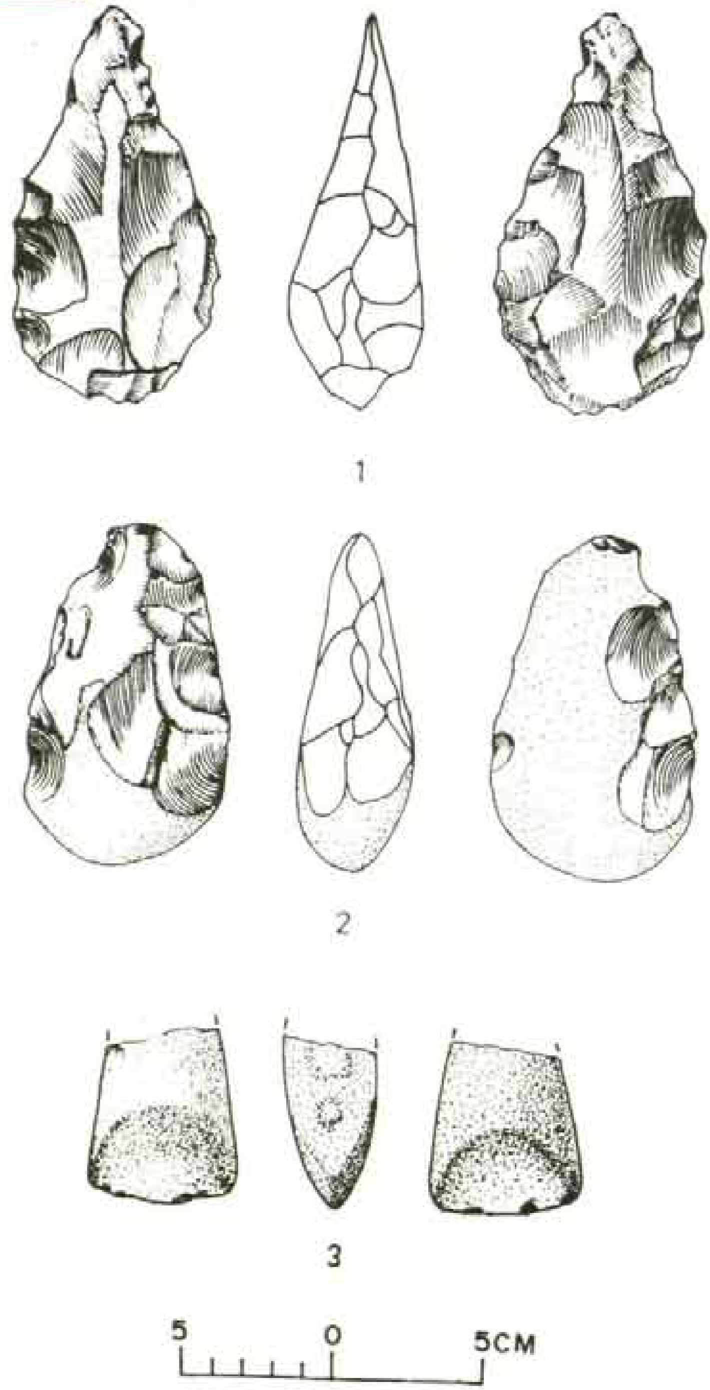
the course of explorations in the submergence area of the Sardar Sarovar Project confining to Thikri and Khasrawad tehsils of District West Nimar discovered the following sites.

Tehsil	Village/Site	Nature of remains
Khasrawad	Akbarpurapura (22° 09'N; 75° 28'E)	Medieval
-do-	Auliya (22° 08' N; 75° 22' E)	Upper Palaeolithic and Chalcolithic
-do-	Bhoinda (22° 07'N; 75° 22'E)	Late medieval
-do-	Bijgun (22° 07'N; 75° 24'E)	Historical
-do-	Boargaon (22° 07' N; 75° 35' E)	Historical
-do-	Chichali (22° 08'N; 75° 24'E)	Chalcolithic and Early Historical
-do-	Daal Khera (22° 09'N; 75° 32'E)	Medieval
-do-	Ghatwarya (22° 08' N; 75° 22' E)	Chalcolithic
-do-	Jalanpura (22° 09'N; 75° 32'E)	Medieval
-do-	Nagawan (22° 07'N; 75° 25'E)	Medieval

Tehsil	*nilage/Site*	*Nature of remains*
Khasrawad	Takakhal (22° 08'N; 75° 26'E)	Historical
Thikri	Brahmangaon (22° 07'N; 75° 17'E)	Late Medieval
-do-	Chainpura (22° 07'N; 75° 15'E)	Historical
-do-	Chichli (22° 01'N; 75° 15'E)	Early historical
-do-	Jarway (22° 06'N; 75° 23'E)	Historical
-do-	Kheri (22° 04'N; 75° 24'E)	Historical
-do-	Lehargaon (Bhagawanpura) (22° 05'N; 75° 22'E)	Early historical
-do-	Nandgaon (22° 07'N; 75° 18'E)	Chalcolithic site locally known as Rahad Kot and historical site known as Boradi Khera
-do-	Parvatpura (22° 06'N; 75° 21'E)	Historical
-do-	Vishwanath Khera (22° 07' N; 75° 16' E)	Late medieval

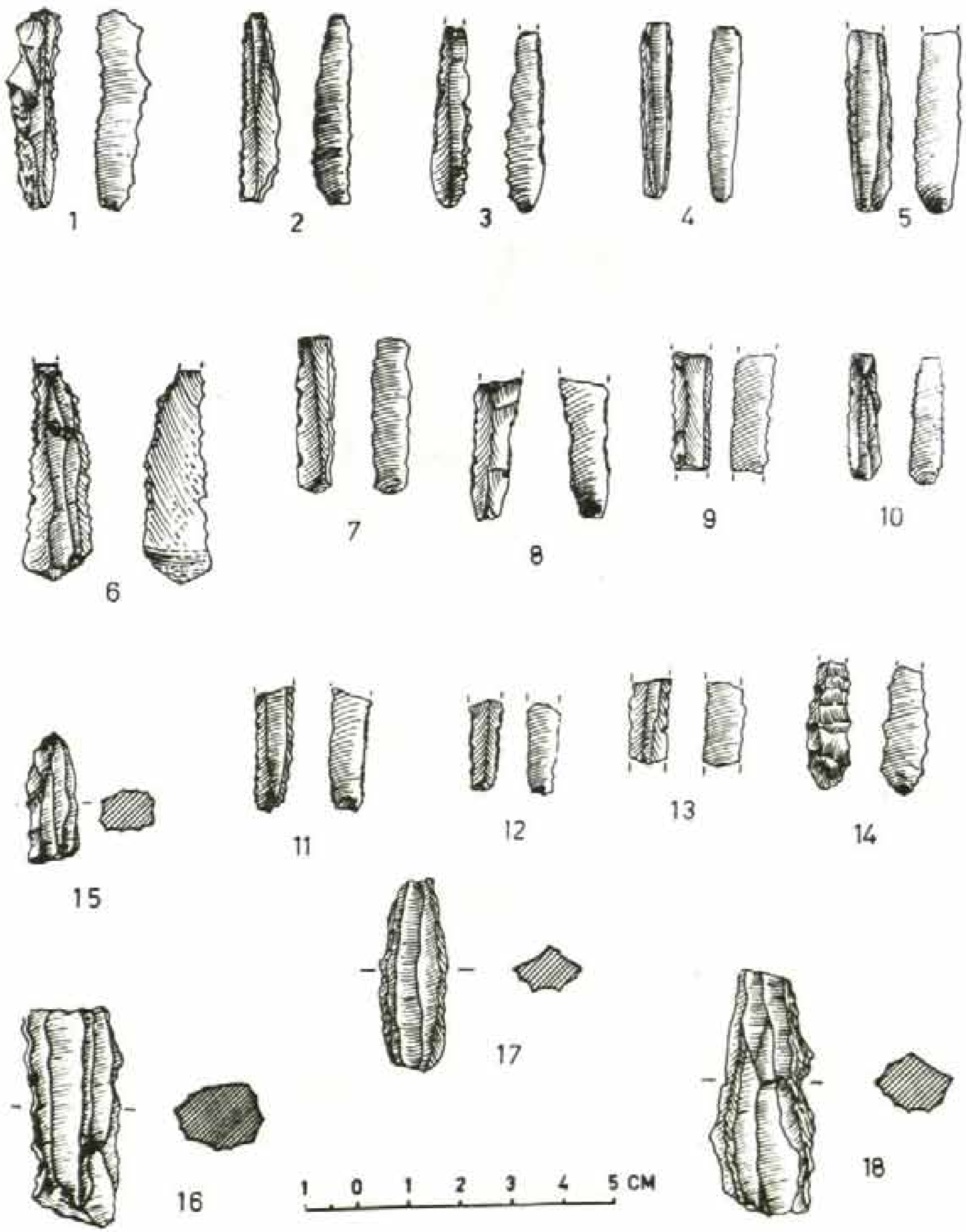
The Prehistory Branch, Nagpur, of the Survey under S.K. Mittra, assisted by R.K. Dwivedi, N.K. Nimje, P.S. Pashine and A.P. Gadekar revisited the sites to ascertain the potentiality for undertaking large-scale excavation work for the 1998-99 field season. In the process, the team explored the sites of Kathora,

Fig. 28



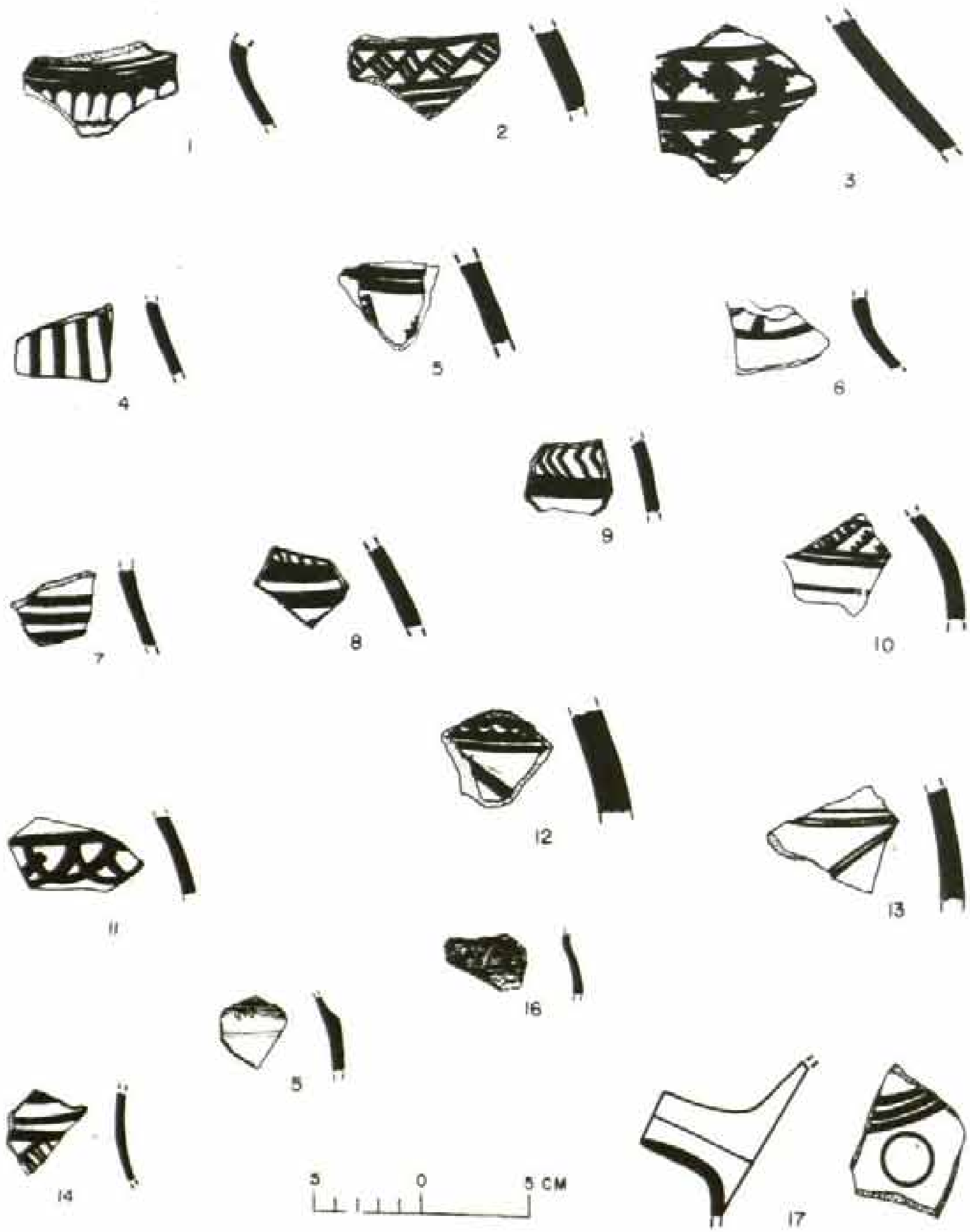
1 & 2, *Chichali : handaxes*; 3, *Ghatwarya : neolithic celt*

Fig. 29



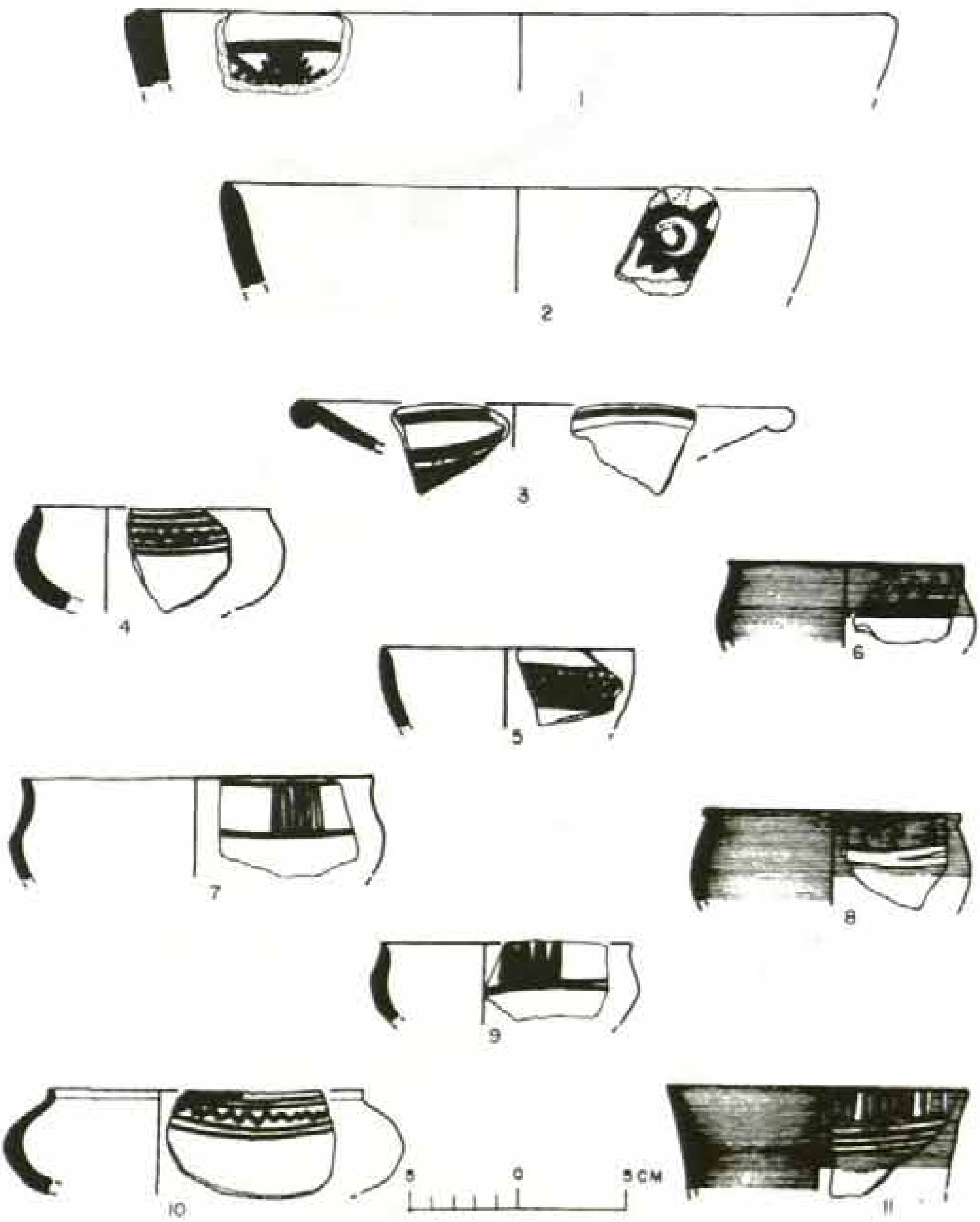
Chichali : microliths

Fig. 30



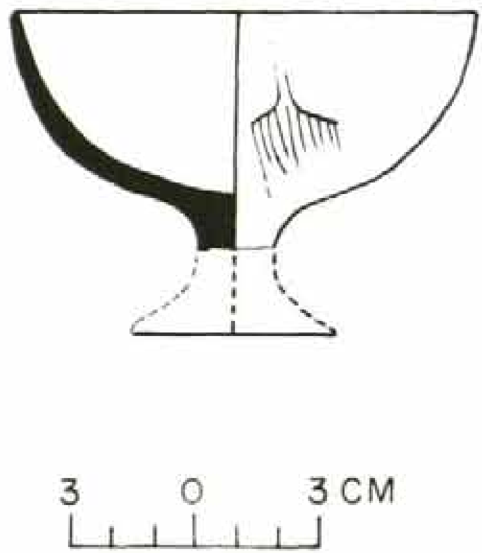
Chichali : painted black on red ware

Fig. 31



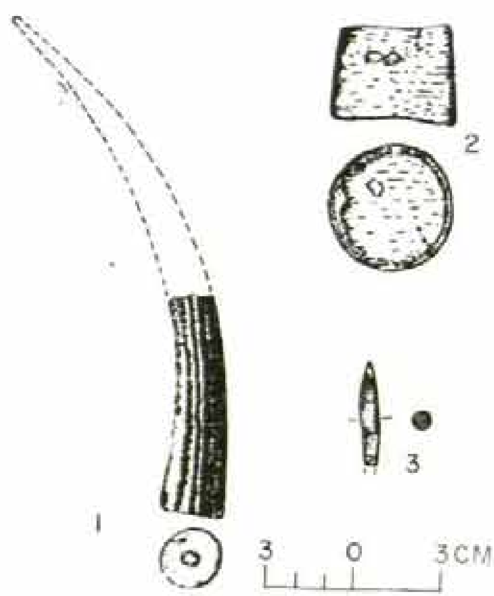
Chichali : painted black on red ware

Fig. 32



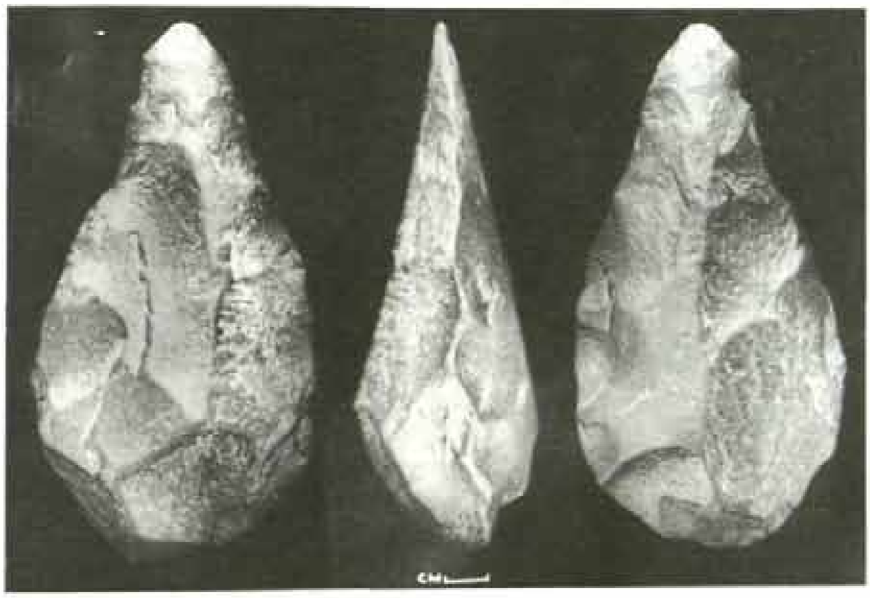
Chichali : chalice cup with graffiti

Fig. 33

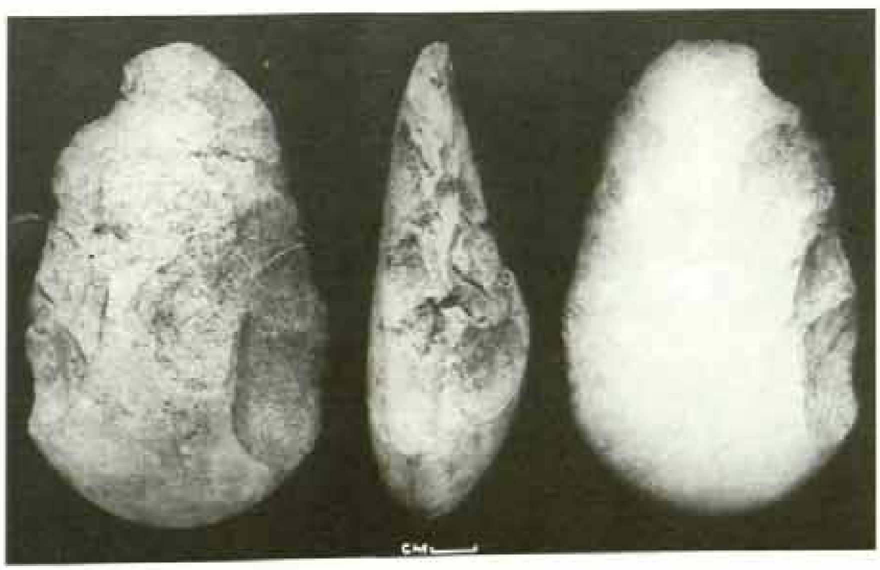


Chichali : 1, antler bone; 2, terracotta weight ? & 3, bone point

PLATES 88-89



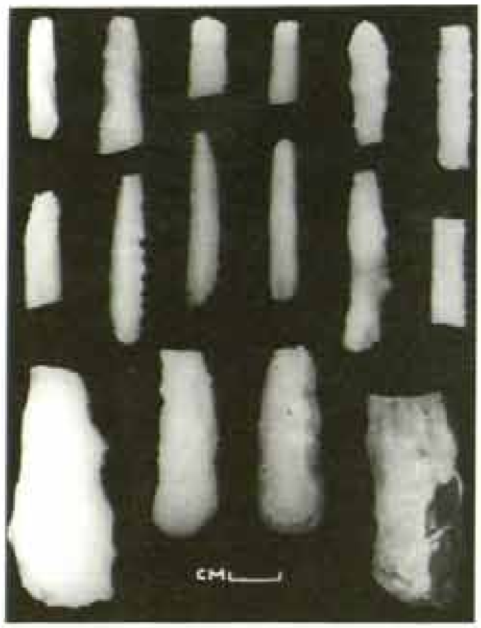
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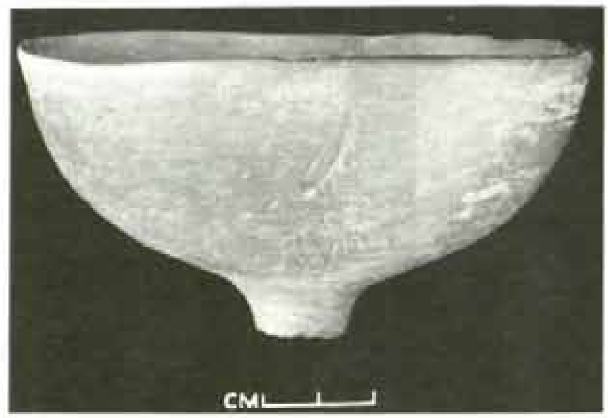
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Chichali : 88 *and* 89, *handaxe*

PLATES 90-93



90



91



92



93

Chichali : 90, *microliths;* 91, *chalice cup with graffitti;*
Pichauri : 92, *terracotta objects;*
Ghatwarya : 93, *neolithic celt*

Kirmohi, Pichauri, Dehdala, Taluq Barwani, Ghatwarya and Chichali, Taluq Khasravad on the left bank of River Narmada.

This exploration has yielded very important surface finds at Chichali, Ghatwarya and Pichauri. The Chichali finds consist of handaxes (fig. 28; pls. 88-89), fragment of legged-quern bearing Mauryan polish, microliths (fig. 29; pl. 90). Besides, a good number of painted sherds have been collected which consist of black-on-red ware, black-on-buff ware, black-on-dull red ware and white painted black-and-red ware (figs. 30-32; pl. 91). The total ceramic assemblage relates to Malwa ware. The thick and sturdy fabric in some cases closely resembles the late Harappan ceramic industry.

At Pichauri the presence of thick, sturdy and well levigated deep red ware fabric with black painted broad bands, strongly suggests a late Harappan ceramic affinity and a couple of terracotta objects were also found (pl. 92).

One of the important finds is from Ghatwarya, which has yielded a broken ground and polished neolithic celt, fashioned on basalt (fig. 33; pl. 93).

MAHARASHTRA

38. Excavation in Paithan, District Aurangabad

In continuation of the last year's work *(1996-97,* p. 70), excavation was resumed under the collaboration of Mini Circle, Goa, of the Survey and the Society for South Asian Studies, U.K. The work was directed by J.V.P. Rao and Derek Kennet assisted by Manoj Saxena, Goutam Haldar, Giridhari Gaekwad, M. Kasturi Bai, Necholas Perchard and Lindsay Lolyd-Smith. During this season the excavation was undertaken within the protected area designated as Trench A where early medieval brick temples were uncovered by Sayed Yusuf in 1937. However, he could not document and study these temples in detail, hence the present task was carried out to unravel their importance in the field of architecture, chronology and history. Originally the Yusuf s trench measured 30 sq m but the present dig was confined to 15 x 17 m sounding. In fact, it is not clear whether Yusuf had fully recorded the temples, which being brick-built and having been exposed to the elements for more than sixty years, were beginning to show signs of erosion. The work has enabled to put together a detailed phasing of the structures which should be supplemented by some absolute dating evidence once the pottery and coins are studied.

In addition to the work on the brick temples, a small 3 x 3 test sounding was undertaken in the area to the south, S. Yusufs main trench (Trench A). The aim of this is to establish the southern limits of the early historic urban area between Trench A and the trenches at the extreme southern end of the site.

Trench A comprised the northern and southern temples (fig. 34; pl. 94) discovered by Sayed Yusaf in his 1937 excavations where work of cleaning and recording was taken up.

The north temple consists of a square sanctum with a rectangular *mandapa* attached to the eastern side. Within the *mandapa* is another wall attached

Fig. 34

PAITHAN EXCAVATION, AURANGABAD 1997-98

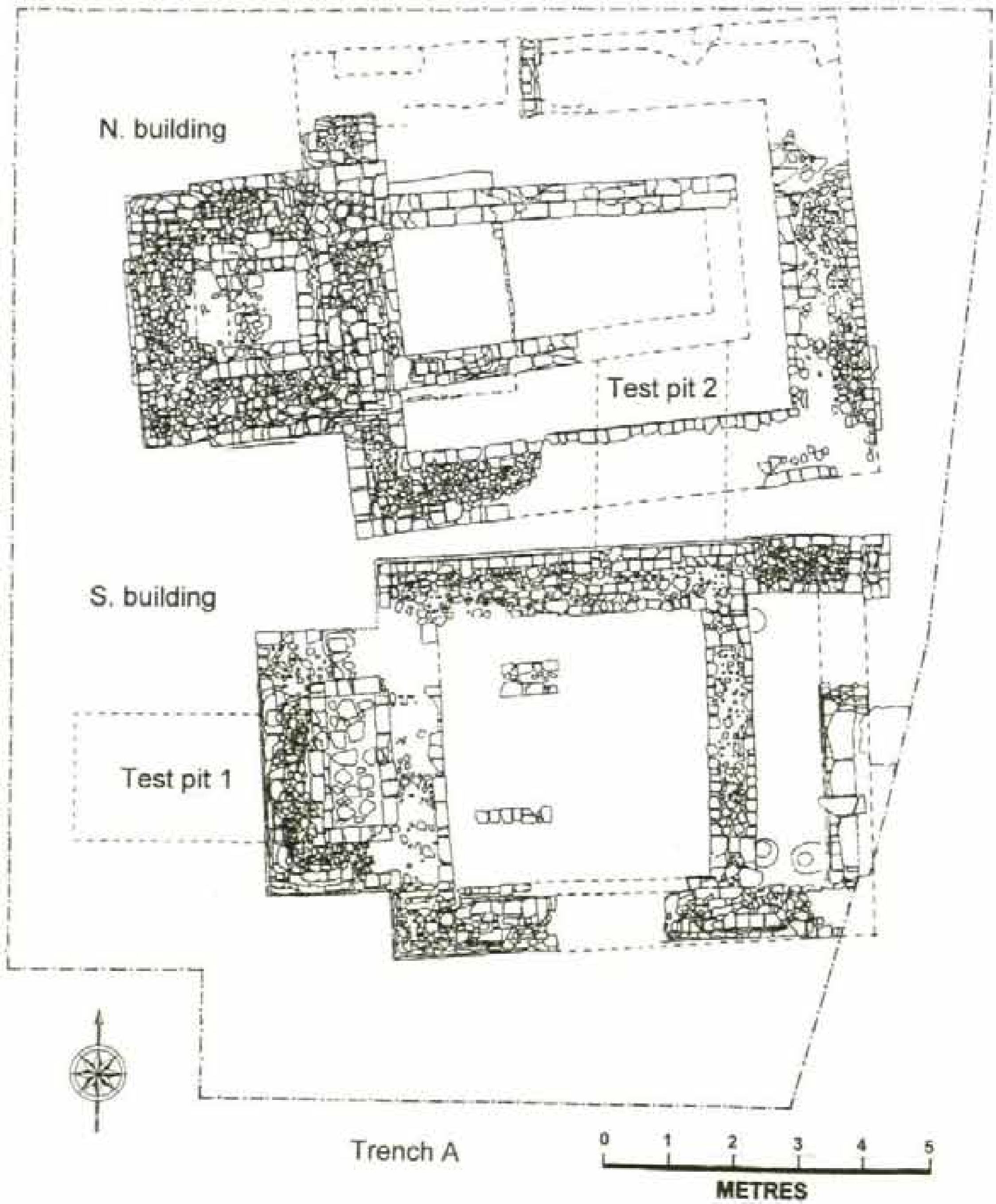
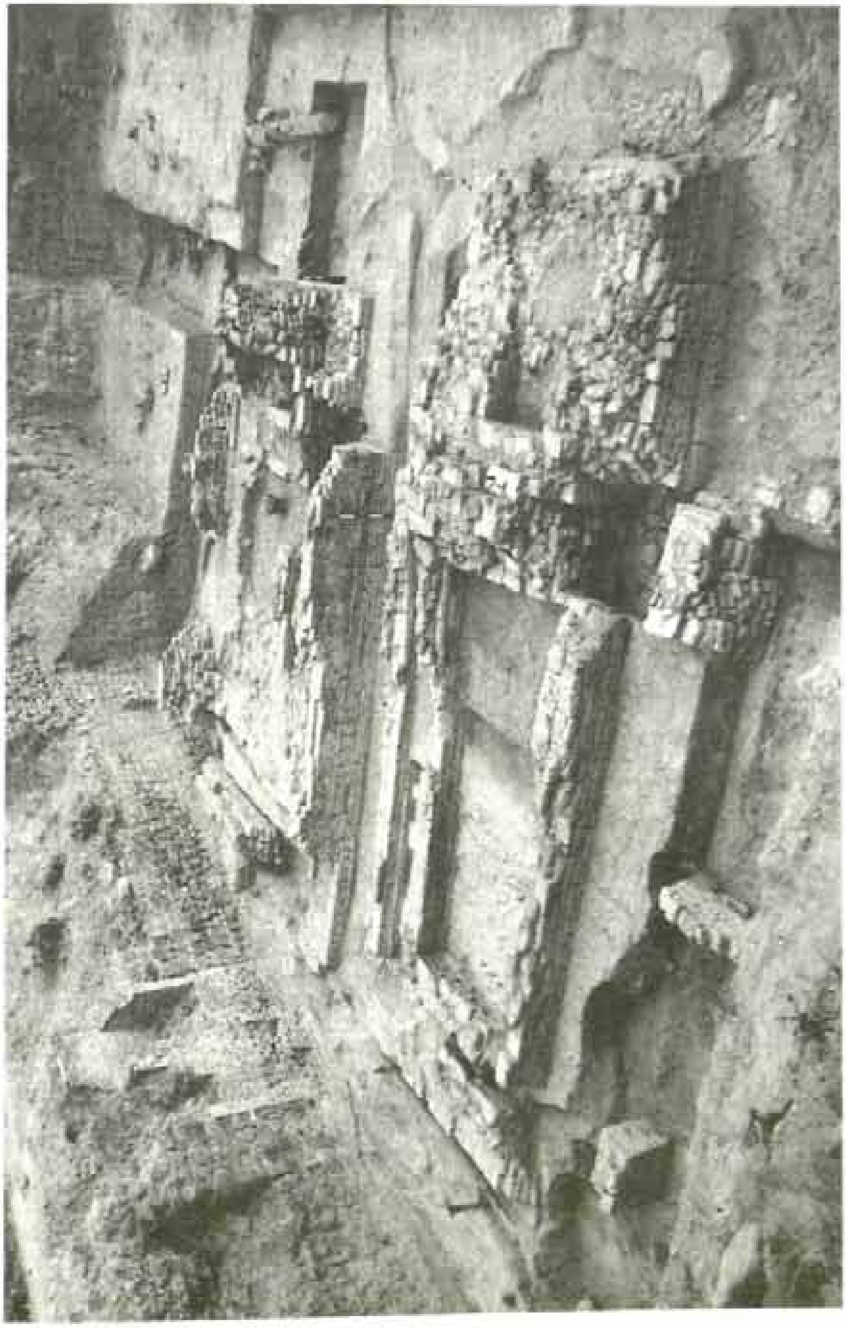


PLATE 94



Paithan : exposed temple

to the sanctum and forming a narrow ambulatory between itself and the other *mandapa* wall. The temple is oriented in east-west direction and the maximum dimension is 11.3 m east-west and 7.64 m north-south.

The northern temple, constructed of bricks and mud mortar, can be divided into five distinct structural phases with two sub-phases in the fourth phase.

The earliest phase which is represented by a small square structure measuring 2.08 x 2.04 m on the exterior and 1.06 x 1.10 m in the interior is possibly opened to the west. The extant height of the shrine measures 1.12m having fifteen courses of brick and width of the wall being in-between 45 cm and 54 cm. The size of the brick includes 40 x 25 x 7 cm and occasionally brick measuring 33 x 25 x 7 cm were also used. Robber's pit exposes the lower courses on the northern side where a recess of two thick bricks was noticed which perhaps represents the *kantha* of *adhishthana.* ~

During the phase II, a thick wall with *triratha* pattern was built around the earlier shrine, which measures 4.2 m across. The size of the brick is same as in phase I, although different sizes were used in the upper courses indicating repairs. Using the earlier wall as inner face of the *triratha,* the outer face was constructed of orange red brick of the same size of phase I. The space between the two faces measures between 73 and 81 cm wide and is filled with a hearting of roughly coursed brick bats in a silt matrix. There is no indication of roofing on the structure. Therefore, it continued to be a free standing structure.

Phase III represents the addition of a *mandapa* to the east of the shrine defined by the addition of 1.12 m thick outer wall to the east and enclosing an area 7.54 m north-south and about 8 m east-west. The wall is constructed of two outer faces of bricks with a core of brickbats and lumpy silt. The bricks of the lowest courses, which can reliably be assigned to the original construction, measure 4 x 25 x 6.5 cm. They are a slightly powdery orange red and the joint is of fine silt.

A section *of adhishthana* moulding (24 cm) is preserved on southern face of the sanctum. The moulding is very similar to the better preserved moulding of the first phase of the south temple. It consists of one-course *urdhva-padma,* one-course *kantha* and a three-course *vrtha kumada.* A small section of the *urdhva-padma* is also preserved on the west face of the surviving stump *of mandapa* wall, which is a later addition to the wall. It seems most likely that a similar moulding ran right around the outer face of the wall.

An *antarala* was added by raising the floor level with black cotton soil supported by a line of brick veneering which is regarded as sub-phase of phase IV. During sub-phase IV b, the *mandapa* was reduced in size by the addition of inner wall in rhomboidal shape which facilitates a sort of ambulatory in-between the main *mandapa* wall and itself. Most importantly the bricks of this wall are larger in size and hence useful in tying the phasing of the north temple with the phasing of the south temple.

There was extensive robbing activity towards the north of the temple because of the missing north *mandapa* wall.

The southern temple consists of a rectangular sanctum and rectangular *mandapa* having *adhishthana* moulding from bottom to top, *upana, urthva padma,* champfered *kantha* and *kumuda* on the exterior wall portion. The size of the brick used is 43 x 25 x 6.5 cm same as in sub-phase IV b of north temple. There are also sub-phases identified in this temple which includes eastern extension *of mandapa,* and subsequent repairs to the walls *of mandapa* and to the eastern entrance.

Basing on the architectural features like *adhishthana* mouldings, sizes of bricks, a tentative date is suggested to these temples from *circa* fifth to eighth-ninth century AD.

39. Excavation at Mansar, District Nagpur

Exploration and excavation at Mansar (21 ° 24' N; 79° 17' E) were carried out under the supervision of Bodhisattva Nagarjun Smarak Sanstha Va Anusandhan Kendra, Nagpur, directed by Jagat Pati Joshi and A.K. Sharma, assisted by Julfiquar Ali, Archana Dubey Asthana, P.M. Khobragade and J.S. Dubey in the area locally known as Hidamba Tekdi which has been now designated as MNS-3. The hill is basically made of granite flow of lava.

The explorations in the area have yielded stone tools right from Early Stone Age to Late Stone Age. The Early Stone Age tools which have been shaped out of quartzitic sandstone and crystalline quartz, found in the seams of basaltic deposit comprising handaxes, cleavers, choppers, scrapers etc., mostly belong to Late Acheulian period. The Middle Stone Age tool kit comprises smaller handaxes, points, cleavers, scrapers etc., is mostly on quartzitic material. Majority of the tools of these periods are digging and cutting tools, pointing to the fact that the Early Man at Mansar was predominantly dependent on vegetarian food rather than on hunting. The Late Stone Age tools comprise both geometric and non-geometric ones, shaped out of crystalline material such as quartz, chert, chalcedony and agate. These comprise triangles, points, trapeze, lunates, borers, burins, etc. In the hillocks few rock-shelters and caves have been noticed which were probably used by the Early Man of Mansar.

Along the bank of the present Mansar lake, a few megalithic cairn circles have also been noticed.

Digging in the eastern peripheral and the central areas of MNS-3 gave the evidence that the early settlers of the area of the historical period decided to build a stupa following the natural contour of the hill (pl. 95). The early stupa found in the central area was having four to five courses of brick 48 *x* 25 x 8 cm in size. This earliest stupa was having a diameter of 14 m. Not much could be said about its superstructure as its three sides were superimposed with massive later structures which could not be removed. This stupa was later enlarged by using bricks of the size 42 x 22 x 7 cm. It was increased by making brick boxes filled with earth and small boulders, a technique of building stupa also excavated

PLATES 95-96



95



96

Mansar : 95, view of the steps and fourth stupa from east; 96, view of Purushamedha from east

at Pauni

. The present available height thus achieved was 2 m in the peripheral area and 3.6 m in the central area of the stupa boxes. It has a *pradakshinapatha* around it and a rectangular projection is also available in the eastern side. This stupa has been given support on the eastern side with a stone-rubble revetment having 8 to 9 courses of boulders. A fragment of a soapstone relic-casket along with a lid fragment has also been recovered from the peripheral area of this stupa. On the northeastern side there is another brick structure which has been badly damaged.

On the northeastern side of the central area an oval *chaitya* built in two phases having a pedestal on the northern side and an entrance on the western side was exposed. It is 8 m long in the north-south and 5.50 m in width in east-west.

After an accumulation of 1.25 m deposit, at the end of the Satavahana period and the beginning of the Vakataka period, two sacrificial altars, one in the shape of a *syenachiti* and the other a *kurma chiti,* made of bricks have been exposed. The *syenachiti* which is in the north was made after smashing the cross walls of the boxes of the earlier *stupa* which has gone out of use by that time making the ground levelled.

In the *syenachiti* figure of a *Purusha* made of lime has been found sacrificed with his head smashed. The head of the figure is oriented towards west whereas the legs are put towards east (pl. 96). A *vedi* in the chest portion with a hole for fixing *ayashti* over it was made and a lamp was found kept nearby. Two pots have also been kept near the knee region of the figure on his right side with an iron snake kept near his left toe looking towards the human figure. Contemporary to this *Purushamedha,* was a simple stone temple with a *mandapa* and a *garbhagriha* on the western side of the mound. Adjoining the *kurmachiti* in the southern side there is a stone staircase comprising eight steps leading towards a small *havana kunda,* a lime kiln and a square shrine made of bricks which apparently appears to have been a *Saiva* shrine as there is a hole for outlet of water. Stratigraphically, it appears that the sacrifice was made at the end of the Satavahana period and the beginning of the Vakataka period. A whitish layer seals the sacrificial altars and other associated structures.

During this period, in the eastern side of the mound, a magnificent temple with a plinth of dressed sandstone blocks and supersturcture of bricks was built on the top by the Vakatakas. This temple with two phases of construction has yielded many fragmentary sculptures having impressive head dresses and bedecked with jewellery. These are in the best traditions of the Vakataka art.

Besides, a coin of Western Kshatarpa king showing Swami Rudrasena Ill's bust on the obverse and on the reverse a *chaitya* with inscriptions reading *Maha Kshatrapasa Swami Rudradaman Putasa Raja Maha Kshatrapa Swami Rudrasena* 21 Saka (AD 348-378) was discovered. Sculptured and architectural fragments on white stone, rough grained sandstone and fine grained rose coloured sandstone, were also recovered from dig (pl. 97).

PLATE 97



Mansar : headless kinnara

During this period, after the Vakataka activities ceased, particularly keeping in view the commanding position of the hill, the Buddhists finally built a stupa having twenty-four brick-built boxes with a central box, all filled with rubble and stone. It is having a diameter of 18 m and steps on the eastern side. This large stupa was built at the top and remained in existence till the end of the seventh century AD. This stupa was also associated with an oval *chaitya* on the southeastern side which was built over an earlier *chaitya*. Again on the eastern side a large impressive staircase has been exposed for approaching structures built in different periods with its length and height increased through the centuries. The staircase also shows the evidence of the use of temple material in the stage of its renovation and enlargement during the time of the last stupa. Thus the Hidamba Tikdi at Mansar gives the succession of culture from *circa* 200 BC to AD 700. This period has yielded a copper coin of Vishnukundin dynasty and belongs to King Mahendra Verman of fifth century AD.

Other finds of the season's dig include large, number of iron objects, glass pendants and terracottas from all the periods. A copper coin of Bahmani king of fourteenth century has also been found from the top layers.

MANIPUR

40. Excavation at Khamaran, Khaniran, District Imphal

The excavation at Khamaran village (24°52' N; 93°53' E) situated at a distance of 12 kms to the north of Imphal was carried out under the supervision of S. Bheigy Singh and K. Indrani Devi assisted by K. Dinamani Singh, N. Ibomcha Singh, K. Gunindro Singh and Kh. Renubala Devi.

The site is located on the fringe of Luwangching hill, about 24.384 m high from the foothill. It is a secondary pot burial site.

A trench measuring 4.5 x 4.5 m was laid out and excavated upto the depth of 1.15 m. The excavation revealed two phases of pot burial layers. The depth of the first phase is 0.77 m with twelve pot burials and the depth of the second phase is 0.38 m showing six pot burials.

In most of the burials three or four jars in the sequence of the smaller ones being kept inside the bigger ones are interned inside a big jar. The innermost jar of each burial is entered with charred bones and charcoal. Ornaments such as finger rings, bangles, anklets, armlets of bronze are encountered in some of the burials along with the charred bones. The innermost jar is again covered by either inverted ring, footed bowls or bowls as lids. Most of the jars are slightly elongated. Every burial has either a vase or long and narrow globular jar or spouted jar as associated pottery. Almost all the pots are broken except a few smaller ones. Other finds include implements like spear-head and knives of iron. Among the antiquities the discovery of one mini bamboo basket is most interesting. It has 9 cm diameter and 6.5 cm in height.

Pottery comprised orange-red in colour. But a vase and a spouted jar of dark grey colour were also

discovered. The jars are decorated with both stamped and incised designs.

41. Exploration in District Imphal

K. Indrani Devi and K. Dinamani Singh of the Department of Archaeology, Government of Manipur explored Koirengoi (24°53' N; 93°55' E) and Kouturk (24° 53' N; 93° 55' E) villages. A stone inscription was discovered on the left bank of Imphal river. The texture of the inscribed stone is of medium fine sandstone having the size of 79 cm in height, 17 cm in thickness, 41 cm in breadth on the lower portion and 31 cm on the upper portion. The inscription consists of eighteen lines in Bengali script. A secondary urn burial site on the fringe of a hill, about 9.144 m high from the foothill was discovered. The antiquities collected from the site include globular jars, vase, bronze rings, etc.

ORISSA

42. Exploration in District Cuttack

In the course of exploration on the right bank of the River Mahanadi in the Banki tehsil of District Cuttack, reconnaissance survey work was carried out by P.K. Dikhit, G.L. Katade, S.K. Dey, B.B. Badamali and R.N. Sahoo of the Excavation Branch-IV, Bhubaneswar, of the Survey, under the direction of Bimal Bandyopadhyay and A.K. Patel. The following archaeological remains were brought to light.

Village	*Site*	*Nature of remains*
Banara	Subudhesvara Temple Complex 20°25'08"N; 85°45- 17"E	Unidentified mutilated stone sculptures
Bidyadharpur	Site near Godisahi Railway crossing 20° 27'30" N; 85° 48'05" E	Small caves on laterite rock
Charigharia	Godatala 20° 25' 40 " N; 85° 41' 36 " E	Mound having grey ware and red ware of medieval period
Danaparha Garh (Danpada)	Jagannath Mundia 20° 23' 14" N; 85° 37' 10" E	Remains of a medieval fort, having grey ware and sculptures of Ganesa, Karttikeya and Parvati in temple-complex
Gayal Banka	Site near Pata (lake) (Jaria soni Thakurani) 20°25'09" N; 85°42'00" E	Mound having grey ware and dull red ware of medieval period

Village	*Site*	*Nature of remains*
Gayal Banka	Pathara Chakada 20° 25' 09 " N; 85° 42' 00 " E	Post-holes in series on rock surface probably of seasonal camp of medieval period
Ghasiputa (Jat Mundia)	KakudiPadia 20° 24' 40 " N; 85° 37' 29 " E	Mound badly disturbed by flood, yielding red ware and grey ware of medieval period
Indumati Patana	Site near Bada pata (Near Chandi Mandir) 20°24'09"N; 85°37'30"E	Mound having grey ware and dull red ware of medieval period
-do-	Banapadia 20° 24' 09" N; 85° 37' 30" E.	Rock-cut well, mound having grey ware of late medieval period
-do-	Chandi Mandir (Modern temple) 20° 24' 09" N; 85° 37' 30" E.	Unidentified stone sculpture, most probably of a king sitting on a throne
Kain Mundi	Dihamala 20° 26' 04" N; 85° 41' 03" E	Mound having grey ware and red ware of medieval period
-do-	Haladibari 20° 26' 04" N; 85° 41' 03" E	Medieval habitational site yielding grey and dull red ware
-do-	Site near Indira Prathamika Vidyalaya 20° 26' 04" N; 85° 41' 03" E	Mound having grey ware and red ware of medieval period
-do-	Sijumula 20° 26' 04" N; 85° 41' 03" E.	Mound having grey ware and red ware of medieval period

Village	*Site*	*Nature of remains*
Kushapangi (Tangara Sahipada)	Dhanaghara Mundia 20° 25' 09" N; 85° 38' 10" E.	Post-holes in series on rock surface of medieval period
Muraripur	Puruna Dhipa 20° 26' 42" N; 85° 38' 00" E.	Mound, badly disturbed by flood, yielding red ware and grey ware of medieval period
Padmapur 20° 26'47" N; 85° 49'03" E.	Padmapur	Jaina sculpture and female figures
Pathapur	Mangala Diha 20° 26' 32" N; 85° 39' 24" E.	Disturbed mound yielding red ware and grey ware of medieval period
Pathapur (Amarendrapur)	Pandava Khara 20° 26' 32 " N; 85° 39' 24 " E.	Rock-shelter, later converted into cave with modern paintings
Ratagarh	Jateswara temple Parvati 20° 26' 21" N; 85° 49' 00" E.	Ruined temple with sculpture of Varaha, and Ganesa
Ratagarh	Sikhareswar temple 20° 26' 21 "N; 85° 49' 00" E.	Ruined temple with sculpture of Siva
Upara Pathapur	Hadua 20° 26'03" N; 85° 39'00" E.	A reservoir with five bounds of medieval period

43. EXCAVATION AT UDAYGIRI, DISTRICT JAJPUR

The Excavation Branch-IV, Bhubaneswar, of the Survey, under the direction of Bimal Bandyopadhyay and A.K. Patel assisted by P.K. Dikhit, G.L. Katade, S.K. Dey, S.K. Kunthia, B.B. Badamali, R.N. Sahoo and S.K. Bhoi carried out excavation at Udaygiri-2, a Buddhist site with an aim to lay bare the complete plan of the monastery and to know the cultural sequence of the site.

Udaygiri (20° 38' 45" N; 86° 16' 25" E) is situated 102 km north-east from Bhubaneswar in a valley surrounded by Assia Hills on the west, south,

south-east and north and open land in the east reaching the bank of the river Bada Genguti (Birupa). The horse-shoe shaped valley is vertically divided into two halves by a spur. Both halves have rich archaeological remains of the Buddhist era (pl. 98). The northern half of the valley had been excavated from 1985-86 to 1989-90 which had brought to light remains of a huge monastic-complex protected by a large enclosure wall, a seven metre high stupa having images of four *dhyani* Buddhas in the niches on all four cardinal directions. Besides the Buddha images, sculptures of Tara, Avalokitesvara, Maitreya, Aparajita, Vasudhara, Jambhala and Hariri were also recovered. Among other antiquities, a good number of seals and sealings were found which read as *Shri Madhavapura Mahavihara Arya Bhikshu Samghasya* identifying the ancient site of Udaygiri as "Madhavapura Mahavihara". The Buddhist establishment here can be datable between *c.* eigth-ninth century and twelfth-thirteenth century AD.

After a gap of eight years, a team of the Excavation Branch IV thoroughly surveyed the adjoining area. As a result, in the southeastern half of the valley, an isolated area on the hill slope bearing antiquarian remains was identified and named as Udaygiri-2. This is located at a distance of about 400 m in south-east direction of the earlier excavated monastery. The archaeological remains are spread in an area of about 400 x 300 m on the hill slope with a total deposit of 5 m (pl. 99). Intensive study of surface features suggested that large monastery, stupa, *chaitya* and other structures are lying buried under this elevated ground. The area was covered with thick vegetation. After cleaning, the area was divided into squares of 10 m each in grid pattern. The mound selected for excavation has elevated peripheral surface with deep depression in the centre suggesting remains of monastery.

Totally, ten trenches numbering A4, A5, XA6, XB2, XB4, XB5, XB6, XC4, XC5 and XC6 were undertaken for excavation. Four trenches, *viz.,* XB2, XC4, XB6 and A4 were excavated to ascertain the outer walls of the monastery on north, west, south and east respectively. One quadrant each of these trenches were exposed upto natural soil level. Trenches XB5, XB4 and one quadrant of XA5 were dug upto the floor level in order to expose sanctum sanctorum, courtyard, passage verandah and one cell respectively. Deposit outside the monastery has two layers in general; the first layer is of collapsed debris of the monastery while the second one is depositional affected by the erosion due to slope of the hill. The layer is resting upon the natural soil (pl. 100).

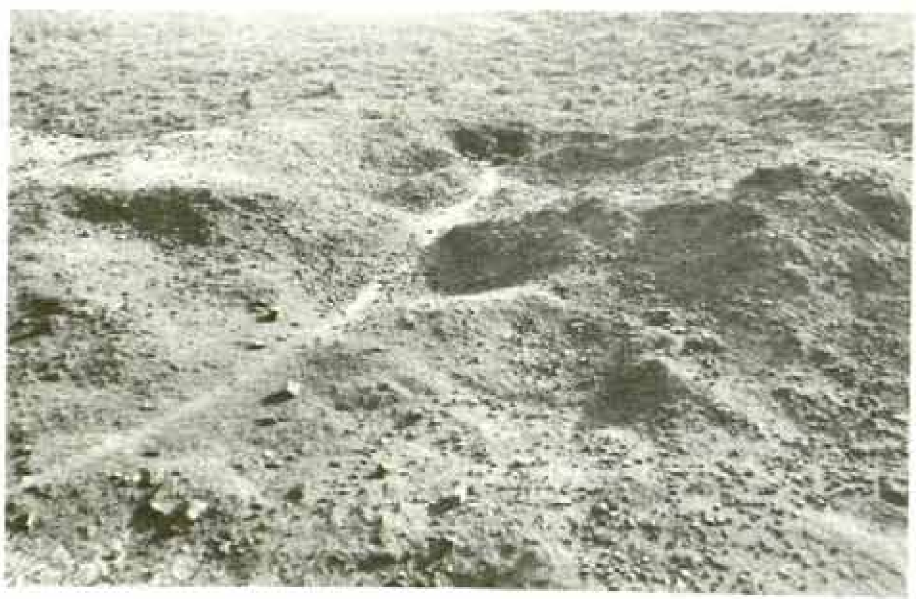
The excavation conducted so far has partly laid bare an impressive brick-built monastic-complex datable to the eigth century AD. The excavated remains suggest that it is square on plan measuring 30 x 30 m. The outer face of the southern side wall has been cut into projections giving an impression like *pancharatha;* the first projection at 9 m, the second at 3 m and the length of the third is 3.6 m.

It has already been stated that the monastery is located on the hill slope, the slope, being from west to east. The excavation has revealed that the monastery was directly erected over the slopy surface. The surface was cut on the west, north-west and southern sides while on the eastern side; the outer

PLATES 98-99



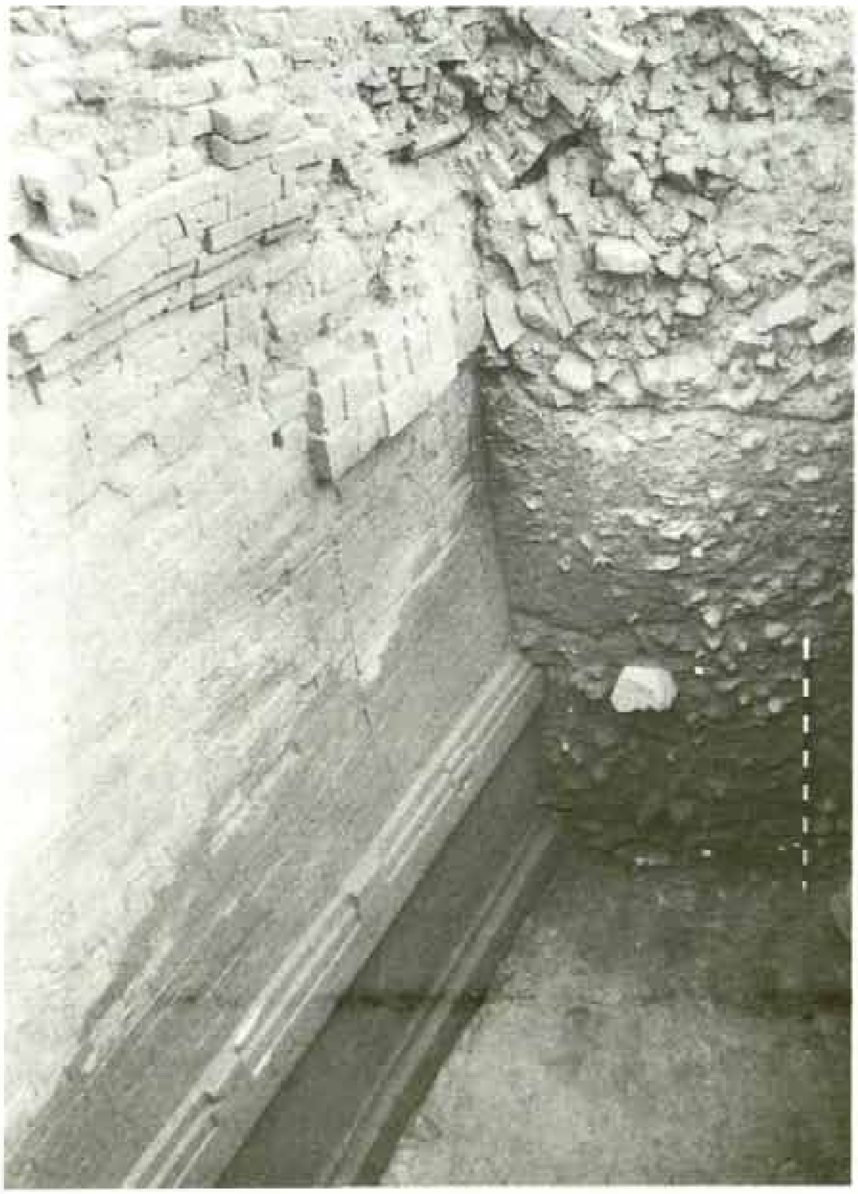
98



99

Udaygiri-1 : 98, general view; Udaygiri-2 : 99, general view

PLATE 100



Udaygiri-2 : section facing north

PLATE 101



Udaygiri-2 : sanctum sanctorum with pradakshinapatha

wall was made high to maintain the required level inside the monastery. The outer wall on the east has sixteen small offsets at the base in order to protect outward thrust of the inner filling. Here, the application of offsets increased the thickness of the base by 0.5 m.

The shrine chamber is located in the centre on the southern side measuring 3.75 x 2.75 m which contains colossal seated image of Buddha in *bhumisparsha-mudra* measuring 2.60 m in height with pedestal. The pedestal is resting on the stone paving. Two door jambs are standing *in-situ* at the entrance of the sanctum whereas the lintel is collapsed over the debris inside the sanctum. The walls of the sanctum are 1.5 m thick. One of the most outstanding features is provision of an ambulatory path *pradakshinapatha* measuring 1.4 m in width around the sanctum sanctorum (pl. 101). On the back side wall of' the *pradakshinapatha,* two arched windows were provided on either side for fresh air and light, but later on, these windows were closed. The walls separating *pradakshinapatha* and the cells are 2.15 m thick.

The southern back side wall is projected southward to accommodate the upper sanctum sanctorum. The upper sanctum is directly erected on the southern outer wall, forming a shrine chamber of 2 x 2 m and is also provided with stone pedestal (pl. 102). Originally, the floor of the chamber was paved with stones but later on, it was coated with brick jelly. Patches of lime-plaster were also noticed over the brick jelly. A small drain is also provided in the southeastern corner of the chamber, which opens outside the outer wall. A votive stupa was found lying over the debris at the entrance of the upper sanctum. Besides, a large number of architectural members of the entrance of the upper sanctum sanctorum were removed from the debris inside the *pradakshina patha*.

Surface indications suggest that the monastery (pl. 103) has cells on all the four sides. One cell lying on the right side of the sanctum sanctorum was completely exposed upto its floor level. The cell measures 2.90 x 2.75 m and has partly survived brick flooring. The cell has only an arched entrance and an arched window. The window measuring 2.00 x 1.4 m was closed during the later phase. Entrances of the other three cells lying on the left side of the sanctum were completely exposed. The door jamb and lintels are in good state of preservation. Each entrance measures 1.5 x 0.7 m. A passage verandah of 2.4 m width running in front of the sanctorum and the cells on the left side of sanctum was completely exposed. An arched window is provided at the rear end of the passage verandah. The passage verandah on the left side of the sanctum has a lime pit measuring 4.5 x 2.5 m belonging to a later phase. This pit was divided into vertical halves by a 35 cm thick brick wall. A stone paved courtyard is provided in the centre of the monastery. Stone slabs of various sizes are used for paving the courtyard.

Some stray finds of structural activities in the form of some irregularly laid brick walls were noticed during the excavation. These activities were found above the collapsed debris of the monastery. Thus, these structures can be assignable to Period II. The excavation has revealed two phases of structural

PLATES 102-103



102



103

Udaygiri-2 : 102, *upper sanctum sanctorum with pedestal;* 103, *general view of the southwestern part of the monastery*

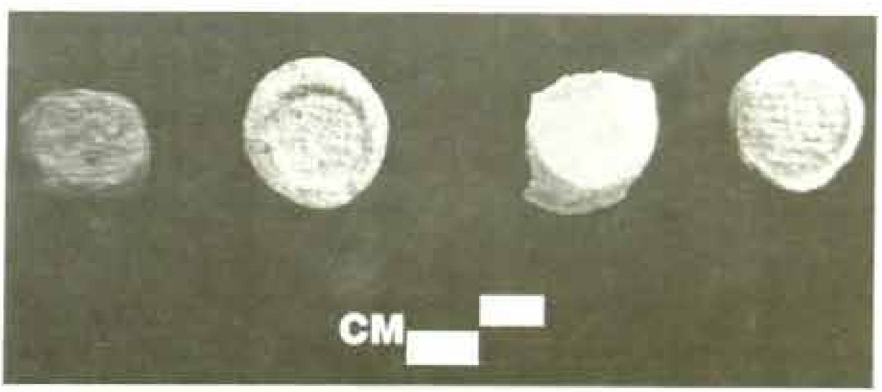
PLATES 104-106



104



105



106

Udaygiri-2 : 104, *Buddha in bhumisparsa-mudra;* 105, *Chunda;* 106, *terracotta sealings*

activities during Period I. The double-storeyed monastery in the original form belongs to Period IA. During the Period IB, the stone-paved floor of the upper shrine chamber was covered with thick coat of brick jelly, the windows were closed and the heights of the entrances of the cell doors were also decreased by putting brick masonry.

The monastery is built up of finely joint cut bricks in mud mortar. The brick sizes are 36 x 24 x 8 cm, 34 x 24 x 7 cm and 36 x 26 x 7 cm etc. The upper storey of the monastery was perhaps built over wooden beams and rafters. Provision of an offset at an equal height throughout inner side of the monastery suggested wooden beams being kept over it. The offset has stone slab at the top throughout to bear the load of the beams.

Pottery of the Period I can be divided into two phases. Pottery include mainly two wares, i.e., grey ware and red ware. Early phase is dominated by red ware and the main shapes are jar, small vases, bowls, crude type of sprinklers, miniature pots, lamps, etc., whereas the later phase is dominated by grey ware with the main shapes being jar, *handi,* dish, bowl and basins.

Among the important finds, stone sculptures of Buddha in *bhumisparsha-mudra* and *dhyana-mudra* are important (pl. 104). Behind the sculpture of Buddha in *dhyana-mudra,* a Buddhist creed, *"Ye Dharma Hetu Prabhava..."* has been written in late Brahmi script and in Sanskrit language. Among others, one sculptures of Tara, (pl. 105). Manjusri, Avalokitesvara, Jatamukuta Lokesvara and terracotta sealings with *Dharini mantra* are noteworthy (pl. 106). Two fragmentary inscriptions have also been retrieved. Out of these, one inscription is inscribed on both the sides. Animal figurines, iron objects, beads, skin rubber, dice, etc. are other finds.

The monastery may be datable to *c.* eight century AD and continued upto the twelfth century AD.

44. Exploration in District Sambalpur

During the course of exploration in District Sambalpur by A.K. Bhargava, S.K. Bhoi and R.N. Sahoo of the Excavation Branch-IV, Bhubaneswar, of the Survey, under the direction of A.K. Patel, encountered a medieval site at Bamragarh (21 °40' 40" N; 84°27' 41" E). The site has been identified as the capital of old Bamanda State. The site has yielded terracotta human and animal figurines and a broken stone sculpture probably of Ganesa.

45. Exploration in District Sundergarh

In the course of the survey of Hemgir hills carried out by A.K. Bhargava, S.K. Bhoi and R.N. Sahoo of the Excavation Branch-IV, Bhubaneswar, of the Survey, under the direction of A.K. Patel, rock-shelters with paintings were noticed near Brahmani Gumpha, Chhengapahar and Phuldungri. The rock-shelters bear paintings mostly in ochre colour with occasional use of white pigments. The paintings are of both animal and human figures comparable to the mesolithic paintings of Central India. In the rock-shelters near Bramai Gumpha, microliths associated with pottery were also recovered.

RAJASTHAN

46. Excavation at Lachhora, District Bhilwara

The Jaipur Circle of the Survey, under the direction of B.R. Meena, assisted by Kanwar Singh, B.R. Singh, took a trial-trench to know the exact nature of sequence and to correlate the stratigraphic position of the site.

47. Exploration in District Jhunjhunu

In the course of village-to-village survey, B.R. Singh of the Jaipur Circle of the Survey, noticed the following remains of archaeological interest in District and tehsil Jhunjhunu.

Village/Site	*Nature of remains*
Churela 28° 10'05" N; 75° 15'05" E.	Late medieval ruined *haveli*
Jit-ki-Dhani 28° 10'05" N; 75° 19'07"E.	Fortress of medieval period
Marigsar 28° 07'00" N; 75° 19'05"E.	Fortress of medieval period
Rizani 28° 09'07" N; 75° 18'06"E.	Grave of late medieval period

48. Excavation at Balathal, District Udaipur

The fifth season's excavation at Balathal *(1995-96,* pp.64-70 and *1996-97,* pp. 90-100) was begun by V.N. Misra, Vasant Shindeand R.K. Mohanty of the Deccan College Post-graduate and Research Institute, Pune and Lalit Pandey and Jeewan Kharakwal of the Institute of Rajasthan Studies, Rajasthan Vidyapeeth, Udaipur, in the third week of November 1997 and continued till the middle of February, 1998. The excavators were assisted by B.B. Dighe, D. Karanjkar, S.A. Pradhan and D.D. Phule, B. Waghmode, Sunil Jadhav and Ravi Dhamapurkar, Balaram Tripathy, Niranjan Kulkami, Swayam Panda and Bhushan Ratanjankar, M.D. Kajale, P.K. Thomas, P.P. Joglekar, Arti Deshpande and A. Kshirsagar who participated in the excavation for specialist studies. M.A. and M. Phil students of the Department of Archaeology, Deccan College and Diploma students of the Institute of Rajasthan Studies, Kajal Shah of the Department of Archaeology, M.S. University, Baroda, Sherna, Lorraine and Tinaz, of St. Xavier's College, Mumbai participated as trainees.

The aims of this season's work were to further uncover the plan, and inner and outer faces of the

fortified enclosure, discovered and partially exposed in the central part of the mound, during previous seasons; to determine the probable function of this structure; to trace the outer fortification wall of the settlement and determine its nature and age; and to find out the relationship between the outer fortification wall and the structures found inside it.

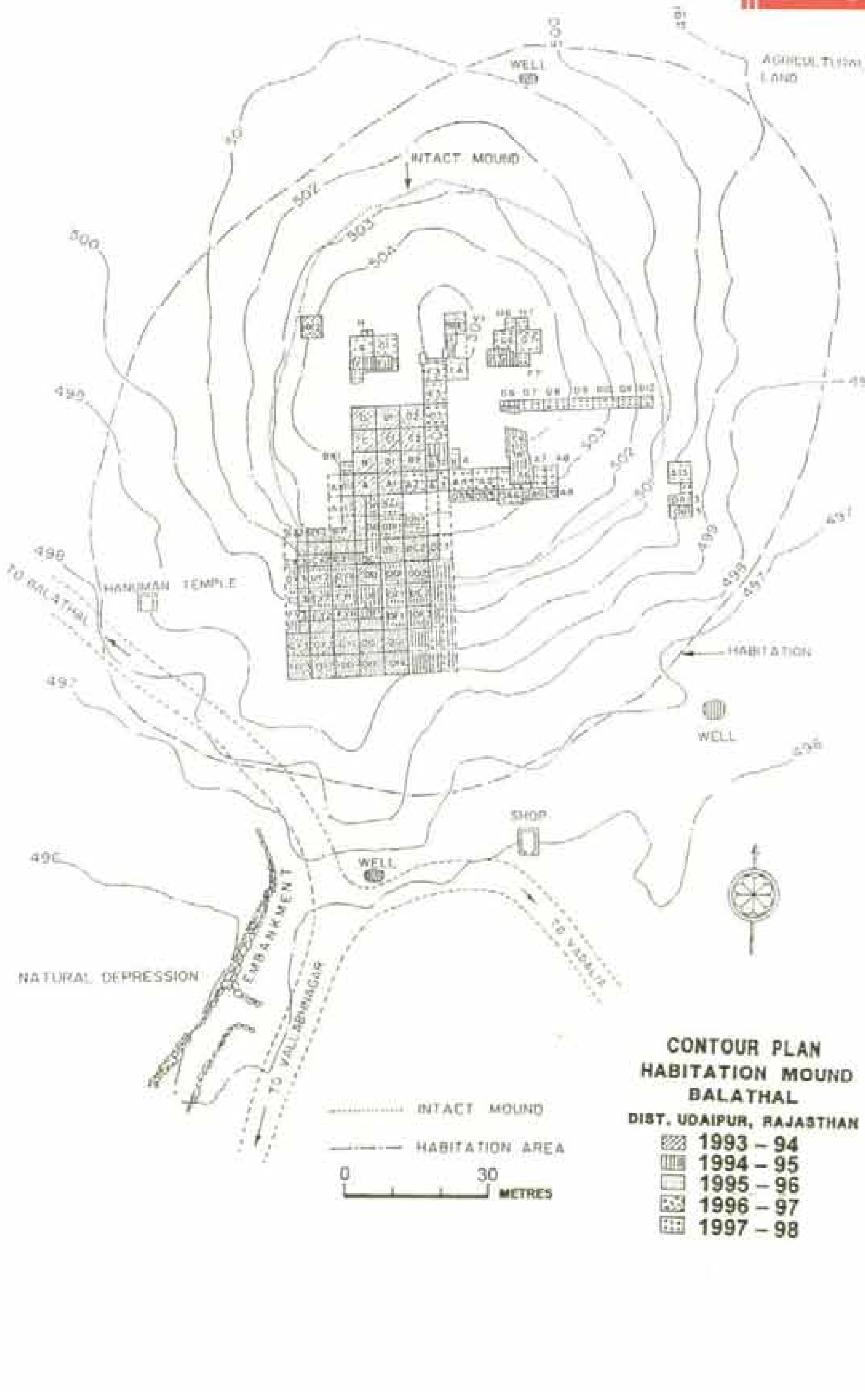
Thirty-eight trenches, each measuring 5 x 5 m and covering a total area of 600 sq m were opened on the eastern part of the mound. Trenches A2, A3, A4 and A5 and parts of Trenches A6, A7, A8, 0A4, 0A5, 0A6, 0A7, 0A8, BX1, F, Fl, F7, G, G1, G6, G7, H, H6 and H7 were excavated to uncover the plan of the fortified enclosure. Trenches C3 (northern half), D3, E3 and F3 were excavated to determine the probable function of the enclosure. Trenches A13, 0A13 and OB 13 were excavated to trace the outer fortification wall. The northern half of Trenches D7, D8, D9, D10, Dll and northwestern quadrant of Trench D12 were excavated to relate the outer fortification wall with the inner structures (fig. 35).

The Chalcolithic period at Balathal has been subdivided into two phases, namely A and B, on the basis of stratigraphy, architecture and material culture. Remains of phase A (c. 2800-2400 BC) have been found in the 90 cm thick deposit at the base of the mound. Trial-trenches at different locations have confirmed that the earlier phase is present almost all over the site, except in the southern part. Digging down to the natural level in the northwestern quadrant of D12 revealed the presence of phase A right upto the eastern margin of the habitation. This phase is characterised by coarse and hand-made plain and painted pottery, circular mud structures and occasional presence of semiprecious stone beads, copper fragments, and total absence of stone blades.

Phase B (*c.* 2400-1800 BC) heralds a significant and sudden change in domestic and defence architecture and material culture and, by implication, in the life-style of the inhabitants. The coarse and hand-made pottery of phase A become gradually refined into fine, wheel-made pottery. Other features of this phase are strong defences in the form of an outer fortification wall-complex; stone and mud-brick residential structures, craft specialisation represented by technologically superior and diverse ceramics and a variety of copper implements; and sudden increase in material culture. Four structural phases have been found in this phase. In structural phase I, two parallel stone walls, running in a roughly east-west direction, were exposed in the northwestern quadrant of Trench D12. They could not be traced eastward because of the presence of the outer fortification wall of structural phase II in this quadrant. The walls, 1.60 m apart and with an average width of 75 cm, have well made faces on both sides. They have been exposed to a length of 2.0 m and have survived to a height of 70 cm.

The entire plan of the fortified enclosure of structural phase II, partially exposed during previous seasons, has been made clear from *sondages* taken at regular intervals along the possible alignment of the structure (pl. 107). The inner and outer faces of the walls, on all the four sides, are made of stones whereas the core is composed of mud, complete and broken mud-bricks, interspersed with stones, all rammed

Fig. 35


AGRICULTURAL LAND
WELL
INTACT MOUND
HANUMAN TEMPLE
TO BALATHAL
HABITATION
SHOP
EMBANKMENT
NATURAL DEPRESSION
TO VALLABHNAGAR
TO VADALIA
INTACT MOUND
HABITATION AREA
0 30 METRES
CONTOUR PLAN
HABITATION MOUND
BALATHAL
DIST. UDAIPUR, RAJASTHAN
1993 – 94
1994 – 95
1995 – 96
1996 – 97
1997 – 98

PLATES 107-108



107



108

Balathal : 107, *excavated structures;* 108, *human skeleton*

hard. The northern wall, which runs straight in the east-west direction, has survived to a height of 2.80 m. Its length along the inner face is 31.40 m and along the outer face is 38.35 m. The average width of this wall on the top is 4.30 m. A prominent bastion was noticed on the northeastern corner of this wall. It is rectangular on plan, measuring 5.50 m (east-west) in length and 3.30 m (north-south) in width. In the northwestern corner, such a bastion is conspicuously absent. However, a small, roughly squarish chamber was found within the stone revetments of the wall near the northewestern corner. A 2.0 m wide gap in the inner face of the wall, 1.60 m to the east of the northwestern corner, possibly represents an entrance to this chamber which may be identified as a guard room.

The western wall of the enclosure, running in a north-south direction, is the shortest. It is 16.0 m long along its inner face and 27.40 m long along the outer face. Its average width on the top is 3.75 m. The eastern wall, running in a broadly north-west south-east direction, has a length of 26.70 m along the inner face and 37.65 along the outer face. In its inner face a gap of 1.65 m, noticed in the 1994-95 season, at a distance of 7.0 m from the southeastern corner, was thought to be an entrance. However, digging in this season has made it clear that the gap represents not an entrance but a later damage to the wall. The width of this wall on top is 6.80 m in the centre. Compared to this the other three walls are thin (average width 4.80 m) on the top. The southern wall of the structure behaves differently from the other walls. Its outer face, from the southwestern corner, runs towards east for a length of 16.45 m and then, turning to the south and runs straight for a length of 9.50 m. The same wall again turns to the east and, at a distance of 2.70 m, projects slightly to the south and runs straight eastward and joins its southeastern corner at a distance of 16.10 m. The inner face of the wall behaves slightly differently from its outer face. From the southwestern corner the wall runs straight in the east-west direction for a length of 15.0 m and then turns south. At a distance of 8.80 m the wall turns to the east and runs in a roughly north-east south-west direction for a length of 14.30 m and joins the southeastern corner of the structure. Some portion of the inner face near the southeastern corner has been damaged possibly due to late disturbance. The width of the southern wall varies from 4.85 m near the southwestern corner to 5.20 m near turning to the south.

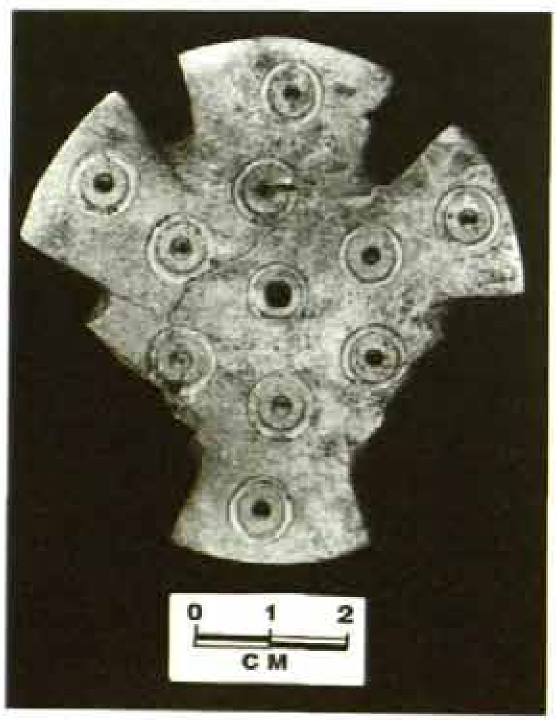
Inside the fortified enclosure a human skeleton was found at a depth of 2.70 m in Trench E3 (pl. 108). It was dumped in burnt cow-dung in a crouching position in north-south direction with head towards the south. A number of small flattish stones were found around the body. Most probably the person was killed, as large battering marks on his head would suggest, and thrown inside the cow-dung deposit. A well made floor was exposed inside the fortified enclosure in Trenches C3, D3, E3 and F3. The floor of yellow silt is laid over thick bedding made of black clay with occasional stones in it. This floor, however, does not give any clue to the function of the structure.

One of the most important contributions of this year's excavation is the discovery of the outer fortification wall (pl. 109), a small part (8.65 m) of which was exposed on the eastern periphery, in

PLATES 109-110



109



110

Balathal : 109, *outer fortification wall;* 110, *bone pendant*

Trenches A13, OA13 and OB 13,55 m to the east of the inner fortified enclosure. The southeastern corner of the wall and some portions on the northern and southern sides has been exposed. The strong defence wall, made of flattish stones set in mud mortar, was constructed on top of a mud and mud-brick platform. It was constructed in two phases. The lower portion of the wall, which is broad at the base and gradually becomes narrow towards the top, represents the early phase. It is 1.15 m high and has nine stone courses. The wall of the second phase, perfectly vertical in nature, has survived to a height of 85 cm. This vertical wall was constructed 35 cm away from the outer edge of the wall of the first phase. On top of the wall of the second phase was possibly a mud brick wall, the traces of which have survived at places. This outer defence wall, 2 m to the west of the defence wall was exposed in the northwestern quadrant of Trench Dl 2. Besides, one more parallel stone wall was exposed. It is not possible at this stage to infer the relationship between these two walls. Considering the nature of construction and stratigraphical position, the defence wall appears to be contemporary to the inner fortified enclosure (Structural phase II).

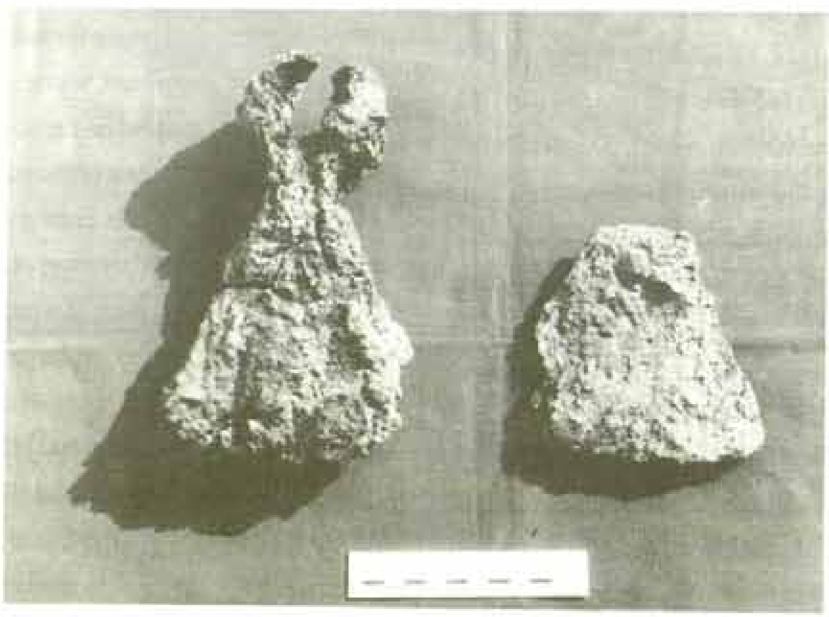
Even though the Chalcolithic phase is quite rich in material remains, the excavation of this season has yielded very few objects. They include the typical objects like beads of semiprecious stones, copper fragments and a variety of stone and terracotta objects. One of the noteworthy objects recovered this year is a large circular bone pendant having six petals, two of which are broken (pl. 110). It is made from a cattle bone, which is ground, flat on both faces and bears incised circular pattern on the petals.

The early historic levels overlying the Chalcolithic deposit were subjected to systematic excavation. As a result of large-scale excavation, it is now clear that the activities of the early historic people had been confined to the southern and eastern parts of the mound over an area of roughly 60 m by 55 m. The early historic occupation was exposed in Trenches A2, A3, A4, A5, D3, E3, F3, parts of A6, C3, F, Fl, G, Gl, G6, H, HI, H6, D7, D8, D9 and D10. The early historic occupation is confined to the top five layers, including the black sterile layer (5/13) overlaid by the uniform white layer of ash (4) (pl. 111). Considering the horizontal nature of the sterile layer and its association with the early historic period, it is apparent that the layer was laid intentionally to create sufficient horizontal space for habitation. A number of burnt wattle-and-daub, rectangular and squarish structures were exposed on the southern and eastern parts of the mound. None of the structures, however, could be exposed in its entirety. In a number of structures were found storage pits, some of which contained charred remains of wheat, rice, black gram and mustard. Besides, a large number of iron implements, including a hoard of rectangular frames, axes (pl. 112), adzes, sickles (pl. 113) spear and arrow-heads, nails, etc. have been found. The most spectacular discovery is a roughly plano-convex terracotta seal with a man riding a horse in low relief and surrounded by a number of animals (pl. 114). Besides, it bears an inscription in Brahmi script (pl. 115), characteristic of the beginning of the Christian era.

PLATES 111-112



111



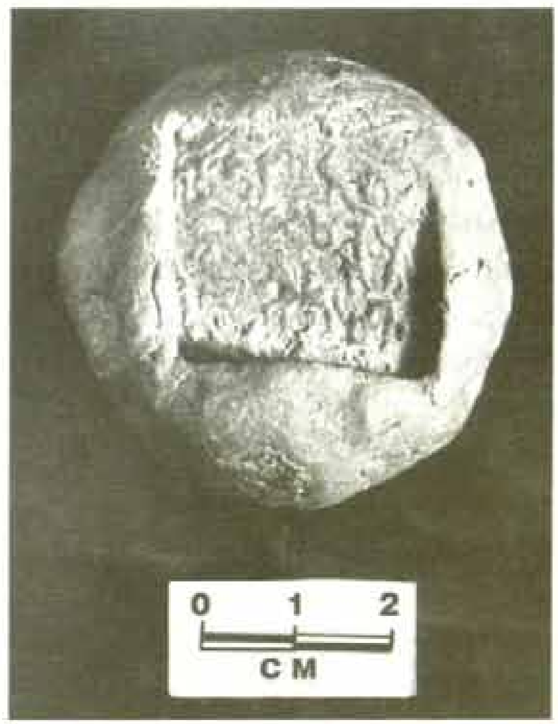
112

Balathal : 111, *black sterile layer with a layer of ash;* 112, *iron implements*

PLATES 113-115



113



114



115

Balathal : 113, *iron sickles;* 114, *terracotta seal;* 115, *seal with Brahmi inscription*

49. Exploration in District Udaipur

Exploration was conducted jointly by Jeewan S.Kharakwal of the Department of Archaeology, Rajasthan Vidyapeeth, Udaipur and VS. Shinde of the Deccan College and Post-graduate Institute, Pune, along the Ahar river in Girwa tehsil of District Udaipur.

A small mound, roughly round, measuring 105 m north-south and 80 m east-west was discovered on the outskirt of Udaipur city. It is located on the right bank of Ahar at Bedla. The site is roughly 7 km upstream of the site of Ahar. The site has about 5 m thick cultural deposit and has revealed two different cultures namely Chalcolithic and early historic. The Chalcolithic pottery, i.e., thick coarse red-slipped ware, coarse grey-slipped ware, thin red-slipped and black-and-red ware, matches very well with that of Ahar ceramic assemblage. It is interesting to record here that apart from Ahar type pottery, a few sherds of tan ware and red ware (perforated), belonging to Harappa culture, were also found at the site. Besides pottery, half a dozen cores of chert and a small knife fragment of copper were also discovered. A squarish structure was also noticed in the central part of the mound. Bedla, on the basis of its size and proximity to Ahar, can be identified as a satellite settlement of the latter.

The Ahar culture deposit is capped by early historic remains as the visible stone structure and pottery would indicate at the site. The ceramic assemblage is represented by red ware, coarse grey and fine grey wares. This asemblage also matches very well with the early historic pottery of Balathal and Ahar, dated between *circa* second century BC to second century AD.

A low mound of medieval period was found close to Bichhri village and Udaisagar, about 18 km east of Udaipur. This site at Bichhri is spread over one and a half hectare area on the left bank of the Ahar river. The ceramic assemblage comprises red and grey wares. The red ware bulbous jars with externally thickened rim and bowls with flared sides are predominant at the site.

Another mound at Bichhri is located on the right bank of the river and also belongs to medieval period. The pottery of this mound was found similar as seen in earlier mound. Several squarish and rectangular stone structures were visible on the surface of the mound.

TAMIL NADU

50. Excavation at Kodumanal, District Erode

The excavation at the site was resumed by the State Department of Archaeology, Tamil Nadu, under the direction of Thiru Natna Kasinathan assisted by K. Damodaran, A. Abdul Majeed, R. Selvaraj, Goewthamaputhiran and S.Munusamy. During this season, nine trenches at the habitational site were laid bare. Two megaliths *viz.,* Megalith 2 and Megalith 3 were opened.

As in the earlier seasons, the excavation revealed only two cultural periods *viz.,* Periods I and II ranging from 300 BC to AD 300. The artifacts comprise fine graffiti potsherds numbering nearly two hundred,

PLATES 116-117



116



117

Kodumanal : 116, *megalithic burial;* 117, *stirrups*

recovered from the habitational and burial sites. Besides, more than one hundred inscribed potsherds were collected from habitational site. In addition to the above a terracotta pipe was also unearthed. It appears to have been used for bringing pure drinking water to the habitation.

The megalithic burial (Megalith 2) yielded five iron swords measuring a length of 1.35 m to 1.65 m and fifty carnelian beads. The grave goods were found placed outside the main cist (pl. 116).

Megalith 3 yielded the objects which are found in main cist only. The artifacts include one four-legged jar, a few iron arrow-heads, hilt portion of a sword and lid of a vessel with a dove figure, knob and four stirrups (pl. 117).

The most outstanding find of this season consists of two NBPW potsherds which confirm the trade and cultural contact of the ancient Tamils with the northern part of India especially the Gangetic region.

51. Excavation at Mamallapuram, District Kanchiplram

The Chennai Circle of the Survey, under the direction of K.T. Narasimhan, assisted by Sathyabhama Badhreenath, G. Thirumoorthy, K.P. Mohandas, R. Jayaraj, R. Vinayagam and J. Kuppuswamy, carried out excavation in north-west area of the Shore Temple-complex in the light of recent discoveries such as miniature shrine, bathing *ghat-like* structure, etc. Besides tracing out the continuation of bathing *ghat-like* structure on northern side, the excavation aimed at exposing the extent of ancient stone flooring encountered incidentally while widening the modern well.

The excavation around the modern well revealed ancient stone flooring with brick structures. The flooring is made of well-dressed stone slabs with lime-mortar pointing. This stone flooring seems to continue towards the temple side, shows that it may be connected to the temple. The level of this flooring coincides with the level of miniature shrine and indicates a probable date of Pallava Narasimhavarman II (AD 700-728) or earlier (pl. 118).

Few trenches laid further to the north of the modern well led to exposure of rectangular brick structures (5 x 4 x 2 m) (pl. 119). Due to lack of evidences, the structures could not be properly correlated. The size of bricks, however, shows that they belong to early medieval period.

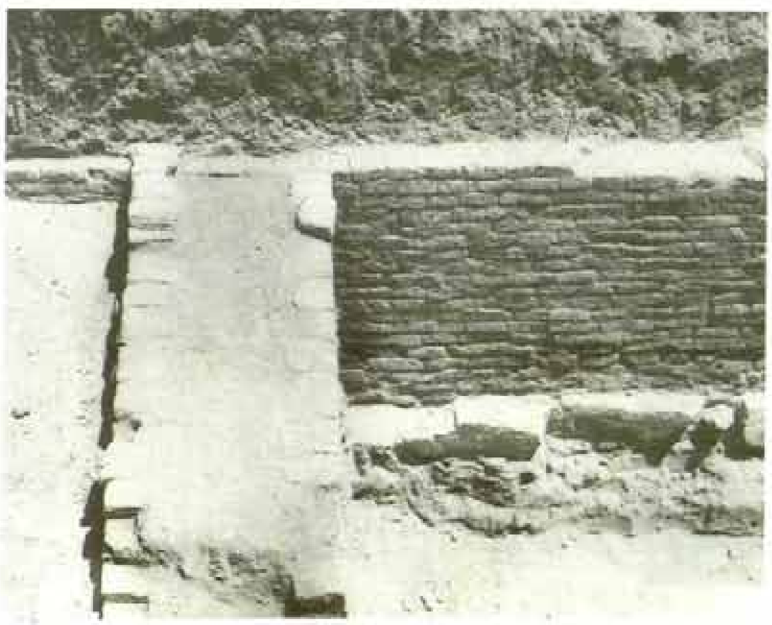
The excavation also revealed the continuation of bathing *ghat-like* structure towards northern side, as the one exposed already on southern side during 1990-91. A total number of five steps built of large laterite and granite slabs were exposed intact (pl. 120).

The bricks (28 x 16 x 5 cm) found in the excavations are well-burnt and confirm as belonging to the early medieval period, whether the structures and the bricks belong to the same period can be confirmed after further excavation. The pottery such as black-and-red ware, black ware and the red ware of various types of the same period were recovered in the excavations. A thick stone rim portion of a large

PLATES 118-119



118



119

Shore Temple-complex : 118, *brick structures with stone flooring:* 119, *rectangular brick structures*

PLATES 120-121



120



121

Shore Temple-complex : 120, *bathing ghat; Pumpuhar* : 121, *inscribed potsherd*

pot is also a significant find. Among the important antiquities, iron vessels (liquid measures) highly corroded, found in cluster, is noteworthy.

Since the above exposed structures are inconclusive and do not throw any definite idea on temple construction activities and bathing *ghat-like* structure, a further horizontal excavation is necessary to understand the art and architectural development of the Pallavas and also to correlate the existing structures and newly acquired finds.

52. Excavation at Pumpuhar, District Nagappattinam

The State Department of Archaeology, Government of Tamil Nadu, under the direction of Thiru Natna Kasinathan, assisted by K. Damodaran, A. Abdul Majeed, Kulandaivelan, T. Subramaniam, D. Muthu and K. Nedunchezian, carried out excavation in twelve trenches in Kilarveli, Kilaiyur, Desaikulamedu in Vanagiri and Melaiyur around Pumpuhar.

Excavations revealed the cultural periods continuously ranging from 300 BC to 1200 AD.

An inscribed potsherd bearing Asokan Brahmi script written possibly in Prakrit language unearthed at Vanagiri is an outstanding find of this season as this is the first occurrence so far. The inscription reads as (A) *hapagetaro*. It is difficult to interpret its meaning (pl. 121).

Besides, a considerable number of terracotta figurines were unearthed in fragments. One of the terracotta deserves special mention. It is a head portion of a male figure assignable to early Chola period.

The most important artifact of this site, a Chola square copper coin of Sangam age, bearing the figure of a Tiger with raised paw and long curved tail, was unearthed at Desai Kula Medu in Vanagiri at a depth of 3.7 m in layer (6). Deer horn, semiprecious stone beads in large quantity and bone arrow-heads were the other antiquities collected during this season.

53. Exploration in District Pi dukkottai

PS. Sriraman of the Chennai Circle of the Survey noticed the following cultural remains under village-to-village survey work in search of antiquarian remains.

Taluk	*Village*	*Nature of remains*
Kulattur	Ammachatram	Megalithic burial site, Jaina beds and bas relief of *tirthankara* and inscription of early medieval period
-do-	Irumbali	Medieval habitation site; ruined temple (Chola period)

Taluk	*Viltage*	*Nature of remains*
Kulattur	Kulattur	Jaina beds and Jaina sculptures of early medieval period; Siva temple {*circa* thirteenth century AD), Vishnu temple {*circa* eighteenth century AD)
-do-	Mangatevanpatti	Megalithic burial site; ruins of Jaina temple {*circa* tenth century AD)
-do-	Melur	Megalithic burial site; loose sculptures of Mahavira, *Sapta-matrika* and Vishnu (medieval period)
-do-	Nartamalai	Rock-cut Siva and Vishnu temple, *Sapta-matrika* sculptures {*circa* eighth-tenth century AD), Devi temple {*circa* sixteenth century AD)
-do-	Pungudi	Siva temple {*circa* fifteenth century AD)
-do-	Satyamangalam	Megalithic burial site, Siva temple with inscription, ruined temple with Ayyanar image, inscribed sluice {*circa* fourteenth century AD)
-do-	Tayinipatn"	Megalithic burial site
-do-	Vellanur	Siva temple with inscriptions {*circa* tenth century AD); Siva temple and *Sapta-matrika* sculptures {*circa* fourteenth century AD)

54. Excavation at Alagankulam, District Ramnad

The State Department of Archaeology, the Government of Tamil Nadu, carried out excavation at Alagankulam, under the direction of Thiru Natna Kasinathan, assisted by K. Damodaran, A. Abdul Majeed, N. Ganesan, Selvaraj. S. and D. Gopalan. Among the finds, a potsherd with decorated motif, female figures probably of foreign origin and another potsherd with graffiti mark of a ship with decorated

PLATES 122-123



122



123

Alagankulam : 122, *imported potsherd;* 123, *potsherd*

motif are remarkable examples for establishing the trade contact of ancient Tamil with the western World in this part of Tamil Nadu.

The potsherd which is believed to be of foreign origin depicts two female figures with their faces turned right. One of the females is found carrying a long necked jar in her left hand while the other female is holding a mirror or a musical instrument in her left hand. There appears to be one more female figure, but the portion of the full figure is lost except the object which was held by her.

These figures are very slim with bangles in their forearm and heavy undergarments, having elongated face and thick lips. Though, the anatomy of these figures resembles closely with the figures of Egyptian origin, the dress and thick bangle/ornaments distinguish them from the Egyptian specimens. Perhaps this potsherd has been imported from outside, roughly datable to second-first century BC (pl. 122).

The potsherd with ship design could be assignable to fourth-fifth century AD (pl. 123).

A square copper coin of the Pandyas of Sangam Age and a few Roman copper coins were also collected. Of the Roman coins, three are identified to have been issued during the fifth century AD bearing the legend *grdaroma narwam.*

55. Excavation at Tiruverkadu, District Tiruvellore

The Department of Ancient History, Culture and Archaeology, University of Madras, resumed excavation at Tiruverkadu, under the direction of S. Gurumurthy, assisted by R. Ponnusamy, M. Seran and P.D. Balaji.

The Trench TVD 4 measuring 6 x 5 m was laid to the east of the Ayyappa Swamigal Mutt and to the west of TVD 3. Cultural deposits in seven layers to a thickness of 2.30 m were uncovered.

Tentatively the deposit was divided into three cultural periods. The Period I has two sub-phases, namely IA - representing the Iron Age phase (400 BC to AD 200) and IB - representing the post-Iron Age phase (AD 200 to 600). Period II is assignable to the early medieval period (AD 600 to 1200 AD) and Period III represents the late medieval period (AD 1200 and after).

Period IA is characterised by the presence of finer variety of black-and-red ware and black ware sherds. Besides, a few coarse red ware sherds, sometimes with designs painted in red ochre were found. Antiquities comprised a few hopscotches and a terracotta bead.

Black-and-red ware and black ware sherds were noticed in the next phase, i.e., Period IB. Large quantity of potsherds were collected in this level. The pottery also included some lids, spouts and pan-supports. A few bone pieces were also noticed. A pottery dump was found very close to the furnace. In this level a rubbing stone, a conch and terracotta objects like broken part of a figurine, bead mould like objects (?) and hopscotches were also recovered. Remains of charcoal were also collected.

In Period II, red-slipped ware sherds and coarse red ware sherds were found. One hopscotch and a few crumbled iron objects were collected. The succeeding deposit assignable to Period III was devoid of antiquities. A few coarse red ware sherds were found.

56. Exploration in District Vellore

K.P. Mohandas of the Chennai Circle of the Survey, noticed the following cultural remains under village-to-village survey.

Taluk	*Village*	*Nature of remains*
Arakkonam	Simkarumbur	Siva temple (Vijayanagara period); rest house (late Vijayanagara period)
Arcot	Attithangal	Subramanya temple (late medieval period)
-do-	Mosur	Siva temple (medieval period)
-do-	Pardarani	Hero-stone (late medieval period)
-do-	Punnapadi	Loose sculptures of Siva-linga, *nandi* and Devi (medieval period)
-do-	Thimiri	Siva temple (late medieval period)
-do-	Valaiyathur	Hero-stone and Sive temple (medieval period)

57. Exploration in District Villupuram

M. Nambirajan of the Chennai Circle of the Survey, noticed the following cultural remains under village-to-village survey

Taluk	*Village*	*Nature of remains*
Gingee	Embalam	Temple of goddess Durga and Tamil inscription
-do-	Iyyakunram Kadali	Siva temple (late medieval period)
-do-		Loose sculptures and Persian inscription

Taluk	*Village*	*Nature of remains*
Gingee	Kalavai	Siva temple with Tamil Inscription (medieval period)
-do-	Krishnapuram	Siva temple (late medieval period)
-do-	Melacheri	Siva temple with Tamil inscription (late medieval period)
-do-	Nilampundi	Temple of goddess Amman (late medieval period)
-do-	Sattaputtur	Siva temple with Tamil inscription (late medieval period)
-do-	Sevalpurai	Siva temple with Tamil inscription (late medieval period)
-do-	Singavaram	Vishnu temple with Tamil inscription (late medieval period)
-do-	Siruvadi	Megalithic burial site
-do-	Vadapalai	Microliths, Vishnu temple (late medieval period)
-do-	Vanakkambadi	Rest house (late medieval period)

UTTAR PRADESH

58. Excavation at Jhusi, District Allahabad

The excavation at Jhusi (25° 26' N; 81° 54' 30" E) was resumed by the Department of Ancient History, Culture and Archaeology, University of Allahabad by J.N. Pal and M.C. Gupta under the supervision of V.D. Misra, B.B. Misra, J.N. Pandey, U.C. Chattopadhyay, D.K. Shukla and Prakash Sinha, Anil Kumar Dubey, Ram Naresh and Vikram Singh also participated as trainees. The excavation team was assisted by L.K. Tewari, V.N. Rai,

Rajendra Prasad, V.K. Khattri, Kamlesh Kumar, Arvind Malviya and Sharad Suman and Sanjay Kumar. The main objective of the excavation was (i) to confirm the stratigraphy of cultures as revealed through the earlier excavations, (ii) to ascertain the nature and thickness of pre-NBPW deposit at the site.

In all four trenches, each measuring 5 square metres were laid out on the Samudrakup mound (pl. 124). The trenches were numbered C-12, D-12, C-14 and C-15. As in 1995, the excavation revealed five cultural phases.

(1) Early medieval period

(2) Gupta period

(3) Sunga-Kushan period

(4) NBPW period

(5) Pre NBPW period

The excavations in Trenches C-12 and D-12 revealed cultural deposits ranging from the early medieval to the Kushan period.

The combined results of the excavations conducted in the four trenches revealed occupation deposit measuring 16.20 m. This deposit contained cultural relics ranging from the Chalcolithic to the early medieval period. The culture-wise break up of deposits is detailed below.

Culture	*Layer*	*Thickness*
Early medieval	1-4	1.10m
Gupta	5-8	1.68 m
Kushan	9-18	3.15m
Sunga	19-20	3.15m
NBPW	21-44	5.84 m
Pre-NBPW	45-63	4.36 m

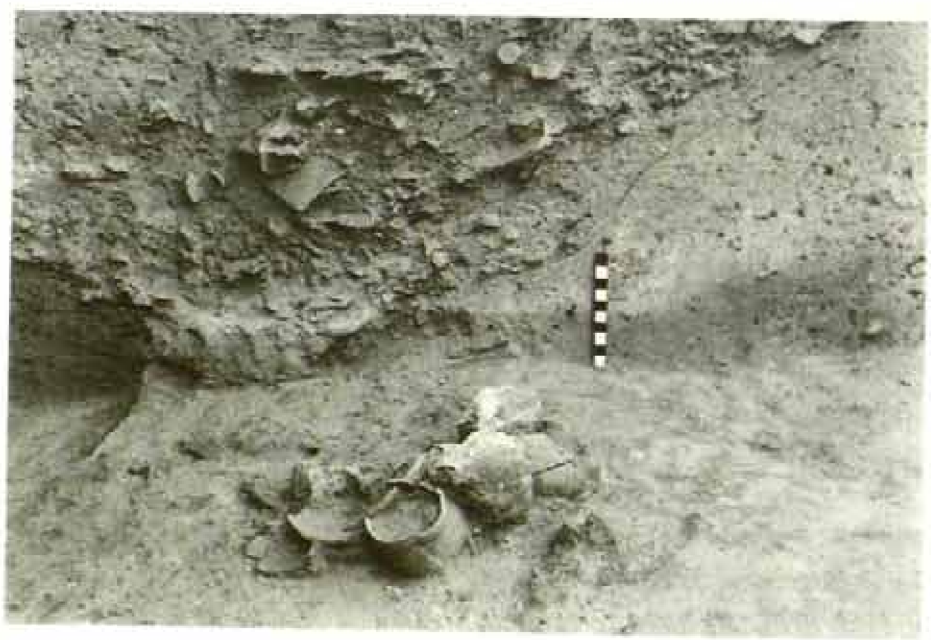
In Square C-15, the layers from 45-63 with a thickness of 4.36 m characterise pre-NBPW deposit at the site (Period I). These layers are composed of potsherds, burnt clay lump, ash and occasionally animal bones. Different floor levels, hearths and post-holes also characterise these layers.

The ceramic assemblage of this culture is represented by black-slipped ware, black-and-red ware and red ware, the last being further sub-divided into ordinary red ware, chocolate coloured red ware and orange coloured red ware. Pots were manufactured on wheel. Typologically, these include pedestalled-bowl, deep bowl with everted rim, convex-sided and hemispherical splayed out rim, convex-sided bowls, lipped-bowls and basins, footed and perforated vessels etc. Some of the sherds in chocolate ware bear paintings, the pattern being the linear one. Besides the pottery, socketed bone arrow-heads and beads fashioned on ivory and semiprecious stones were also obtained from these layers. Post-holes and hearths show

PLATES 124-125



124



125

Jhusi : 124, *general view of Samudrakup mound;* 125, *excavated remains*

the use of burnt bricks. On the basis of presence or absence of iron objects the pre-NBPW deposit may be divided into two sub-groups IA and IB, while the sub-group IA representing layers 52 to 63 has not yielded any iron object. Group IB comprising layers 45 to 51 is associated with iron objects.

The NBPW deposit at the site (Period II), having a thickness of 5.84 m is represented by layers 21 to 44. Out of these layers, 39 to 44 represent the early NBPW phase while layers 38A to 26 characterise the mid-NBPW phase and layers 25 to 21 represent late NBPW period at the site. The NBPW phase at the site has yielded potsherds, iron and copper objects, beads fashioned on semiprecious stones and terracotta, terracotta objects, charred grains and bone objects (pl. 125). From the early NBPW phase no evidence of brick structure has been obtained. Only pits, hearths and post-holes along with burnt clay lumps were encountered at the site. However, from the mid-NBPW phase onwards, brickbats and brick structures were also available. From the mid-NBPW phase in Trench C-15 a burnt horizon was also exposed. This was represented both in section (pl. 126), as well as on plan. Charred grains of wheat, mustard, *moong* and *urad* were obtained from this horizon. A few cast copper coins along with copper objects were also obtained from the same horizon. The available evidence suggest that in the concerned portions grains were stored. It may be pointed out that the burnt surface has been noticed at considerable length beyond the exposed trench both on southern and northern sides, suggesting thereby that during this period the site witnessed a conflagration on a massive scale.

The ceramic assemblage of the period include NBPW, black-slipped ware, black-and-red ware, plain grey ware and red ware, the last one divisible into various sub-groups. Important pottery types include bowls, dishes, basins, medium-sized vases, storage-jars, etc. Some of the NBPW sherds, particularly from mid-phase, are characterised by paintings.

Layers 9 to 20 with a thickness of 3.15 m constitute Period III—the so-called Sunga-Kushan period. Of these, layers 20 to 19 constitute the Sunga horizon and the remaining Kushan. From the Sunga level typical stamped pottery, beads of semiprecious stones and terracotta and a few terracotta figurines were obtained. Burnt brick walls and rooms with brick flooring were also encountered.

The deposit pertaining to Kushan period with a thickness of 3.15 m has yielded typical Kushan pottery, terracotta objects, iron and copper objects, beads fashioned on semiprecious stones and terracotta, bone objects, animal bones, etc. Of the structural activity of the period, mention may be made of burnt brick walls, rooms with brick floor, hearths (pl. 127) etc. The available evidence suggests that there was concentration of population during this period. A few sealings with legends were also obtained from this period.

Layers 8 to 5 with a thickness of 1.68 m characterised the Gupta period at the site (Period IV). Besides the typical Gupta pottery, these layers also yielded terracotta figurines, carved bricks, beads fashioned on semiprecious stones and terracotta, bone objects, iron and copper objects. A few sealings with legend were also obtained from this horizon.

PLATES 126-127



126



127

Jhusi : 126, *section showing evidence of fire;* 127, *structure of Kushan period*

PLATE 128



Jhusi : structure of Gupta period

Remains of houses with brick floors were also encountered. It may be pointed out that in the structure pertaining to Kushan period the incidence of complete bricks is higher than in the case of the Gupta period structure (pl. 128).

It appears that the site, particularly the area which was put to excavation, was abandoned after Gupta period. However, after a considerable time gap it was re-occupied in the early medieval period.

The Period V at the site is represented by the early medieval pottery particularly the glazed ware, terracotta, copper and iron objects, animal bones, etc. A few miniature stone sculptures representing various Hindu gods like Ganesa, etc. were also obtained. The early medieval level at the site was also characterised by stone chips indicating that the stone chipping had taken place in the area on a massive scale. The purpose of which could not be ascertained due to the limited nature of the excavation.

This season's excavation has amply demonstrated the existence of pre-NBPW horizon. If the thickness of the deposit is to be taken into consideration, it suggests a continuous occupation before the emergence of NBPW. The ceramic assemblage and other antiquities of this horizon compare favourably well with their counterparts of different Chalcolithic sites of eastern Uttar Pradesh and Bihar on one hand and those from the Vindhyas on the other. The available evidence from the sites like Sohagaura, Narhan, Khairadih in eastern Uttar Pradesh, Chirand, Chechar, Kutubpur, Taradih and Senuwar in Bihar and Raja Nal-Ka-Tila, Kakori and Koldihwa in the Vindhyas may push back the antiquity of the pre-NBPW culture at Jhusi to the middle of second millennium BC.

59. Exploration in the Mid-Ganga Valley, Districts Allahabad, Kausambi, Pratapgarh, Jaunpur, Bhadohi

The Department of Ancient History, Culture and Archaeology, University of Allahabad, under VD. Misra, J.N. Pandey, J.N. Pal, M.C. Gupta B.C. Shukla and Anil Kumar Dubey conducted explorations in the districts of Allahabad, Kausambi, Pratapgarh, Jaunpur and Bhadohi and discovered a number of sites ranging from Mesolithic to early medieval period, hi all thirty-six sites were explored. The details of the explored sites are given below.

District	*Tehsil*	*Village/Site*	*Nature of remains*
Mesolithic sites			
Kausambi	Manjhanpur	Ark Mahabiram	Non-geometric microliths
Pratapgarh	Pratapgarh	Gadawari	Microliths

District	*Tehsil*	*Village/Site*	*Nature of remains*
Pre-NBPW culture sites			
Allahabad	Handia	Dharampur (Dharma)	Pre-NBPW, NBPW, red ware, ghata-shaped beads
-do-	Handia	Hetapatti Sirohi	Pre-NBPW, NBPW, microliths, Kushan pottery
-do-	Phoolpur	Durbasa Ashram (Kakara)	Pre-NBPW, NBPW and associated wares, some early pottery types, terracotta bead (arecanut type), ring-well and a large brick structure
NBPW culture sites			
Allahabad	Chail	Mahagaon	NBPW sherds along with associated ware, bone arrow-heads, terracotta figurines and other antiquities
-do-	Handia	Mahanaiya-Dih, Jalalpur	NBPW pottery and associated ware
-do-	-do-	Nibhapur-Piprahi	Late NBPW and Kushan pottery
-do-	Phoolpur	Malkhan	NBPW sherds and plain red ware pottery
-do-	Soraon	ChannapurDih (Kharagapur)	Late NBPW, early Kushan pottery and Kushan bricks
Kausambi	Manjhanpur	Bidaon	NBPW and associated pottery
Sant Ravidas Nagar	Gyanpur	Andhedih	Late NBPW and associated pottery
-do-	-do-	Ghatampur	Late NBPW and associated pottery
-do-	-do-	Matethu	Late NBPW and Kushan pottery

District	Tehsil	Village/Site	Nature of remains
Kushan period			
Allahabad	Handia	Bhiski	Pottery of Kushan period
-do-	-do-	Handia	Kushan pottery
-do-	-do-	Neebi	Kushan potter
-do-	-do-	Pathshala	Kushan pottery
do-	-do-	Upardaha	Pottery and fragments of sculpture (Vishnu-Dasavatara)
-do-	Phoolpur	Badara	Kushan and Gupta pottery
-do-	-do-	Kala Kaserua	Kushan pottery, brick structure and early medieval potsherds
-do-	-do-	Mahmudabad	Kushan pottery comprising bowls, lids, sprinkler and spout, etc.
-do-	-do-	Ramnathpura(Dihwa)	Kushan pottery, early medieval pottery, types of red ware, Siva temple, *Siva-linga* made of Kushan bricks
-do-	-do-	Sudanipur	Kushan pottery and brick wall of Kushan period; relics of early medieval Siva Temple, images of Parvati, Nandi and *Siva-linga* and red ware pottery
-do-	-do-	Ummedpur	Kushan pottery and NBP W sherds
-do-	Soraon	MalakPayagi	Kushan and medieval sherds, structures made of Kushan bricks

District	*Tehsil*	*Village/Site*	*Nature of remains*
Allahabad	Soraon	Unch Dih	NBPW and early Kushan period, ancient Sun temple and stone sculptures of early medieval period
-do-	-do-	Soraon	Kushan pottery
Jaunpur	Badshahpur	Nadar	Kushan and Gupta period potsherds and shell bangle pieces
-do-	-do-	NibhapurBaban	Kushan potsherds
SantRavidasNagar	-do-	Bairi-Bisa	Kushan pottery, fragments of pillar depicting *makara vahini* Ganga and *kurma vahini* Yamuna, dancing Ganesa etc.
-do-	-do-	Qierapur/Tikari	Kushan pottery
-do-	Gyanur	Unjh	Kushan pottery
Early Medieval sites			
Pratapgarh	Kunda	BheraharanNath	Siva temple with *ekamukha-linga,* early medieval site
SantRavidasNagar	Gyanpur	Bhideura	Early medieval temple and pottery
-do-	-do-	Semradh	Siva temple, *ekamukha Si\a-linga*

60. EXPLORATION IN DISTRICT CHANDAULI

Rakesh Tewari of the State Archaeology Department, the Government of Uttar Pradesh, undertook exploration in Karamnasa Valley in Chakia tehsil of District Chandauli. During the course of exploration, the sites of Malhar, Munsa Khand, Nakatidari, Nimbia-Ka-tanda, Dhandhra Wali Mana, Banbhikhanpur were brought to light,

while a number of earlier known sites were revisited to assess their significance for further investigations.

A few painted rock-shelters comprising paintings executed over their walls and ceilings are noticed at Nakatidari, Nimbia-ka-tanda and Dhandhara wali Mana. Superimposed paintings include human and animal figures engaged in hunting, dancing and other activities. Most of the paintings are executed in different shades of ochre colour.

Malhar, located on the left bank of the River Karamnasa, has yielded black-and-red ware, red ware, black-slipped ware, grey ware and NBPW, besides stone balls, pestles, terracotta discs and beads, etc. A few examples of cord impressions are also found on black-and-red ware, and red ware sherds. The presence of iron slag and ore in a considerable quantity is notable. The assemblage shows that the aforesaid material may represent the deposits of Chalcolithic, early Iron Age and NBPW periods. Latifshah situated on the left bank of the Karamnasa also consists of the above mentioned ceramic industries noticed at Malhar. However, certain varieties such as cord impressed and incised pottery, besides iron slags have not been found at this site.

Sherds of red ware, black-slipped ware and grey ware contemporary to that of NBPW, besides remains datable to medieval period, have been found at Banbhikhanpur. Remains of Munsakhand include red ware and a few stone images of early medieval period.

61. Exploration in District Lalitpur

In continuation of the earlier work, Ambika Prasad Singh of the Regional Archaeological Unit, Jhansi of the State Archaeological Department, the Government of Uttar Pradesh undertook exploration in development block Birdha, in District Lalitpur, under the direction of Rakesh Tewari and explored thirty-five villages. The exploration of the area, revealed ancient monuments, stone sculptures and other archaeological remains, the details of which are given below.

Village/Site	*Nature of remains*
Alapur	Medieval sculptures
Anora	Temples {*circa* eighteenth-nineteenth century AD)
Kalyanpur	Medieval sculptures
Kuchadon	Medieval temple

Village/Site	*Nature of remains*
Lalitpur	Medieval sculptures, late medieval building, temples {*circa* eighteenth-nineteenth century AD)
Madon	Medieval sculptures, late medieval temple
Nadanwara	Medieval sculptures, remains of medieval temple
Piprai	Late medieval temple, Jaina temple {*circa* nineteenth century AD)
Rajvara	Medieval sculptures
Ramesara	Medieval sculptures

62. Exploration in District Mahoba

In the course of village-to-village survey scheme, Ambika Prasad Singh of the Regional Archaeological Unit, Jhansi, the Government of Uttar Pradesh, undertook exploration in development block Charkhari, District Mahoba under the direction of Rakesh Tewari and explored one hundred and seven villages. The exploration of villages in Charkhari development block revealed ancient monuments, stone sculptures and other archaeological remains. Ancient temples and stone sculptures etc., ranging in date from tenth century to ninteenth century, were brought to light from Charkhari, Tola, Supa, Salat-malat Udaipura, Bomhori-Beldaran, Kakun Satpurave, Kharela, Ram Nagar villages. Out of these a dilapidated medieval temple, known as Kakaramath at village Salat-malat, is noteworthy (pl. 129). Built on a high platform, the whole temple is in ruins except *ardha-mandapa* and *mandapa,* the roof of *mandapa* is almost safe. The lintel of sanctum doorway is carved on *lalatabimba* with an image of Siva. The four-handed Siva, seated in *lalitasana* pose, is holding trident and serpent in upper two hands while the lower right hand is depicted in *varada-mudra* and the other one is chopped off. Brahma and Vishnu are carved on either sides of the door lintel while Ganga and Yamuna are depicted in lower portion of sanctum doorway. *Siva-linga,* installed on a separate platform in front of the temple, seems to be the main deity of the temple. Sculptures of Ganesa, *Nataraja* Siva, Vishnu, Varaha and Parsvanatha datable to the eleventh-twelfth century AD, were discovered in and around the village.

Two images of Surya, datable to the tenth-eleventh century AD, were discovered from village Kakun. One of these images, is installed in the cella

PLATES 129-130



129



130

Kakaramath : 129, *medieval temple; Kakun* : 130, *Surya*

of a dilapidated medieval temple. The upraised hands of this images are broken. In-between his feet there is a human figure, apparently of Prithvi or Mahasveta. Surya is flanked by two of his wives Rajani, Niksubha (Riksubha), attended by Pingala and Danda on two sides. Another image of Surya, in same style, is installed in front of the temple. The second image is noticeable in view of its pedestal which shows seven horses of the chariot (pl. 130).

A temple datable to the twelfth-thirteenth century AD, has been found from the western outskirts of the village Satpurava (pl. 131). The east facing temple consists of plan of *ardha-mandapa* and a sanctum. Built on a low *adhishthana,* the *jangha* is devoid of niche decorations and is surmounted by *varandika* mouldings. The main deity of the cella is missing and no deity has been carved on the *lalatabimba* of sanctum doorway. The *sikhara* of the temple has collapsed but in south-east corner, three *bhumi amalakas* are partly safe. A tank located in southern side of the temple is known as 'Chandelu Talab'.

The town Charkhari is important for its fort, tanks, lakes and temples datable to eighteenth-nineteenth century AD. There are seven tanks around the town and most of these tanks are interconnected, covered with lotus flowers and surrounded by hills. The Deyorhi Darwaza is famous for its architecture and stone carvings (pl. 132). On the top of famous Ranjeeta Hill, there is a fort named Mangal Garh. This fort was built by Maharaja Jagatraja {*circa* eighteenth century) and commands a grand view of neighbouring hills and whole of the town. The temples, which need mention are Guman Vihari Temple, Chakradhari Temple, Chhailvihari Temple and Govardhan natha Temple, specially for their local religious importance.

Village Supa is worth mentioning for its fort datable to the eighteenth century. This small fort was built by Arjuna Singh and the gate, fortification wall and bastion of this fort are almost safe. A masonry *baoli,* in front of the fort, is noticeable in view of its interior constructions.

List of villages with their archaeological details are given below.

Village/Site	*Nature of remains*
Akathohan	Temples *(circa* eighteenth-nineteenth century AD)
Andhora	Temples *(circa* eighteenth century AD)
Bamarara	Medieval sculptures and temples *(circa* eighteenth century AD)

PLATES 131-132



131



132

Satpurava : 131, *medieval temple: Charkhari* : 132, *Deyorhi-Darwaza, eighteenth century*

Village/Site	*Nature of remains*
Bamhori-Beldaran	Gondwani temple *(circa* twelfth-therteenth century AD)
Bhatevara Kala	Siva temple *(circa* eighteenth century AD)
Chandoli	Temples *(circa* eighteenth-nineteenth century AD)
Charkhari	Fort, palace, temples *(circa* eighteenth-nineteenth century AD), tanks
Damdama	Medieval sculptures
Gorakha	Medieval sculptures *(circa* eighteenth-nineteenth century AD)
Gorihari	Temples *(circa* eighteenth-nineteenth century AD)
Gurha	Temples *(circa* eighteenth-nineteenth century AD)
ImiliaDang	Siva temple *(circa* eighteenth century AD)
Jaroli	Temples *(circa* eighteenth-nineteenth century AD)
Kakun	Medieval sculptures, dilapidated medieval temple
Karaharakhurd	Medieval sculptures
Khandia	Siva temple *(circa* eighteenth century AD), tank

	Nature of remains
Kharela	Medieval sculptures, temples *(circa* eighteenth-nineteenth century AD)
Kumhari	Medieval sculptures
Majhol	Medieval sculptures
Malakhanpur	Temples *(circa* eighteenth-nineteenth century AD)
Nareri	Medieval sculptures
Natarra	Temples *(circa* eighteenth-nineteenth century AD)
Paharetha	Dilapidated medieval temple
Pahari-Bhitari	Medieval temple, ruins of fort
Pratistha	Medieval sculptures
Pupavara	Siva temple *(circa* eighteenth century AD)
RamNager	Temples *(circa* nineteenth century AD)
Rihunia	Medieval sculptures, ruins of medieval temple
Sabua	Ram-Janaki temple *(circa* eighteenth century AD)

Site	***Nature of remains***
Salat-Malat	Medieval sculptures medieval temple, palace
Satpurava	Medieval temple, tank
Sudamapuri	Chhatari temple {*circa* nineteenth century AD)
Suhajana	Medieval sculptures
Supa	Dilapidated medieval temple, fort, *baoli*
Swasamaf	Medieval sculptures, runis of medieval temple
Tola	Temple and tank {*circa* nineteenth century AD)
Udaipura	Ram Janaki temple {*circa* eighteenth century AD)

63. Exploration in District Mirzapur

Under the general guidance of Rakesh Tewari, P.K. Singh of the State Archaeology Department, the Government of Uttar Pradesh, explored forty-seven villages of Vijaypur-chhanbe block, under the village-to-village survey scheme in tehsil Mirzapur (Sadar). During the course of exploration twenty-five villages have yielded archaeological finds. A summary of the same is given below.

Site	*Nature of remains*
Badevra Chaube	**Red** ware, black-slipped ware, red-slipped ware
BagheraKhurd	Medieval red ware Red ware, red-slipped ware
Bahutimaya-Chakchaura	
Baisan Ka Purwa	Microliths, red ware

Site	*Nature of remains*
Bajata ,	Red ware, black-slipped ware, red-slipped ware
Balapur	Red ware, glazed ware
BarhaKhurd	Medieval red ware
Birohi	Red ware, microliths
Chareru-Chaukhata	Red ware, red-slipped ware, black-slipped ware (terracotta animal and human figurines)
Chitauli	Medieval red ware
Gaipura	Red ware, glazed ware
GharwasPatti	Medieval red ware
Gogaon	Red ware, black-slipped ware
Hargarh	Medieval red ware
KarniBhawa	Medieval red ware
Kashi Sarpati	Medieval red ware
Kolahi	Red ware, black-slipped ware, black ware and grey ware
Kushaha	Red ware, glazed ware
Leharia	Microliths

Site	*Nature of remains*
Mulahana-ki-Pahari	Black-slipped ware, red ware, red-slipped ware
Patehra	Red ware, red-slipped ware and black-slipped ware
Rambagh Kot	Medieval red ware
Ramgarhwa	Red ware, black-slipped ware, terracotta bead, iron spear-head
Saroi Babu	Medieval red ware
Sikara Kalan	Medieval red ware and glazed ware

64. Exploration in Tehsil Didihat, District Pithoragarh

In continuation of village-to-village exploration, Suresh Kumar Dubey of the Regional Archaeological Unit, the Government of Uttar Pradesh, Almora resumed exploration and surveyed one hundred and forty villages and their hamlets. Archaeological remains including stone sculptures, copper plate and monuments have been brought to light from the following villages.

Village/Site	*Nature of remains*
Agnya	Copper plate of King Kalyanmalla, Saka era 1362 (1440 AD), mentioning landgrant
Bagarihat	Remains of medieval temple and one stone sculpture of *Seshasayi* Vishnu, Durga and fragmentary sculpture
Barakot	Water tank *(naula)* having modern structure over it
Chimoli	A temple constructed with the ruins of a medieval temple having stone sculptures of Ganesa and Varahi and a *vira-khamba* (hero-stone) of late medieval period

Village/Site	*Nature of remains*
Dhokali	Water tank *(naula)* of medieval period covered with a modern structure
Kheti	Two water tanks of five and seven tiers respectively of reservoir *(naula)*
Muleswar Mahadev Temple, Kwerali	A fragmentary stone sculpture (medieval period), tiered water tank or reservoir *(naula)* of *circa* eleventh century AD
Majhera	Water tank *(naula)* having a modern structure over it
Serasonali	Medieval water tank *(naula)* covered with a modern structure
Tharp	Medieval stone *vira-khamba* (hero-stone) and a *naula* (reservoir)
Tripura Devi Temple, Tripuradevi	Medieval stone sculpture of Ganesa
Bhagawati Mandir, Varshayat	Stone sculpture of Ganesa and Sun *(circa* tenth century AD), Vishnu and stone sculpture from adjoining temple

65. Exploration in District Sonbhadra

Rakesh Tewari and P.K. Singh of the State Archaeology Department, the Government of Uttar Pradesh, during further investigations in Robertsganj tehsil of District Sonbhadra, brought to light a few important sites, i.e., Raipura, Mahuaria and Pasahi. First of them is located on the right bank of a small *nala,* a tributary of Belan river. Red ware, balck-and-red ware, black-slipped ware, grey ware and a few NBPW sherds were noticed on the site along with a few microliths. The site is quite extensive, measuring approximately 500 x 500 m., and is under cultivation. Considering the location being nearer to Kaimur range and its assemblage, this site appears very important for the study of pre-NBPW deposits of the area. Pasahi, situated on the right bank of Belan, has also yielded similar ceramic industries as of Raipura; however, the beginning of the habitation at this site

seems to be a little later. The site at Mahuaria, situated at a distance of 500 m from Rajpur on the left of the Rajpur-Lakhania road, has yielded black-slipped ware, red ware and grey ware contemporary to the NBPW.

66. Excavation at Bhagwas, District Sonbhadra

The State Archaeology Department of the Government of Uttar Pradesh, conducted scientific scraping and exposed section at Bhagwas, District Sonbhadra, under the direction of Rakesh Tewari, assisted by P.K. Singh, R.K. Srivastava and G.C. Singh. The prime objective of this year's excavation was to ascertain the pre-NBPW deposit of the upper Belan valley.

For this purpose a section facing east, which was at the western corner of a squarish pond, dug right in the midst of the mound, by local authorities for irrigation was chosen for scraping. It was further extended in the section facing south.

Period I is marked by the presence of black-and-red ware of coarse variety with straw and husk impressions. The black-slipped ware and red ware are other main ceramic industries. The main shapes of black-slipped ware are bowls and dishes. Red ware is of medium to coarse variety. Shapes include water vessels and other big pots. Most of them are treated with straw marks. Structural remains are observed through terracotta nodules and lumps with reed and husk impressions.

Period II is represented by the appearance of NBPW and its associated red ware, grey ware, black-and-red ware, black-slipped ware. The main shapes in NBPW are globular bowl and base of dishes. The main shapes of the black-and-red ware are water vessels and miniature pots. The main shapes in the black-slipped ware are bowls and convex-sided dishes. Red ware includes shapes of water vessels, bowls, storage-jars. Terracotta nodules and lumps are present indicating the structural activities of this period. The noteworthy antiquities comprise iron, terracotta and stone objects.

Marked by the presence of red ware, black-slipped ware and grey ware, the main shapes of red ware in Period III include typical pottery of the Sunga-Kushan period. The main shapes in the black-slipped ware are convex-sided dishes. Terracotta nodules, terracotta lumps with straw marks and reed impressions which denote the structural activity of the period. A floor made of rammed brick jelly and brick nodules mixed with ash is an important find of this deposit.

Period IV is marked by the presence of red ware of coarse to medium fabric. The main shapes are bowls, water vessels, storage-jars akin to those of Gupta and post-Gupta period.

In Period V there is presence of red ware of different shapes ranging from coarse to medium fabric. A circular brick structure of about fifteen courses, made up of wedge-shaped bricks is a noteworthy feature of this period.

Periods IV and V could be assignable to Gupta/ post-Gupta and early medieval periods respectively.

67. EXCAVATION AT NAI-DIH, DISTRICT SONBHADRA

The State Archaeology Department of the Government of Uttar Pradesh, carried out excavations at Nai-Dih, under the directon of Rakesh Tewari, assisted by P.K. Singh, R.K. Srivastava and G.C. Singh with a view to ascertain the pre-NBPW deposits of the upper Belan valley.

A pre-NBPW phase, is represented by black-and-red ware, black-slipped ware and red ware in Period I . The black-and-red ware potsherds are with cord impressions, straw marks and husk marks and the plain black-and-red ware is of fine to coarse fabric. The main shapes of black-slipped ware are slipped bowl, globular bowl, convex-sided dishes, dish with straight sided featureless rim or inturned rim. The main shapes of red ware are miniature vessels, bowl, dishes, water vessels, inturned bowl etc. In addition to the above, corded red ware, red-and-black ware (inner side red) are also found in this deposit. This deposit is devoid of structures, metal and painted pottery. Microliths, terracotta nodules and charred bones with cut marks are other important finds. The deposit is about 1.40 m thick and the period could be dated to 1000-600 BC on comparative basis.

Period II is characterised by the appearance of NBP W and its contemporary pottery. Other ceramic industries are red ware, black-slipped ware, black-and-red ware and grey ware. NBPW sherds are bichrome, spotted red surface and plain normal type. The main shapes are convex-sided dishes and bowls, dishes of inturned rim. The main shapes in the red ware are bowls, dishes, water vessels, storage-jars, flat-footed bowls, spouted vessels, miniature pots, convex-sided dish with inturned rim or collared rim, bowl with featureless rim. The main shapes in the black-slipped ware are bowls and dishes. The main shapes in the grey ware are bowls and dishes. The sherd of black-and-red ware contain cord impression, husk marks, regular vertical and horizontal impressions forming rigdes and grooves, few treated with red slip. The assemblage includes both hand-made and wheel turned varieties. The main shapes comprise water vessels, spouted vessels, convex-sided dishes, and bowls with collared and out-turned rim. The structural activities in this period are represented by terracotta nodules, lumps with reed impression and straw marks. Other finds include iron implements and slags, bone points, terracotta objects, stone objects and microliths.

Period III is represented by a red ware ceramic industry datable to Sunga-Kushan period. A brick-structure forming a wall of seven courses has been found in this level.

68. EXCAVATION AT SRAVASTI, DISTRICT SRAVASTI

In continuation of the previous year's work *(1996-97,* pp. 171 -176), the Excavation Branch III, Patna, of the Survey, in collaboration with the Archaeological Research Institute of Kansai University, Osaka, Japan has conducted excavations at Sravasti. The excavation was carried out under the joint direction of G.T. Shendey of the Survey and A. Abosi of Kansai University, assisted by D.K. Ambastha, D.K. Singh, N.K. Sinha, J.K. Tiwari, P.C. Das, S.P. Gupta, O.P. Pandey and B. Prasad of the Excavation Branch III, Patna and F. Yoneda and others of the Japanese team.

The excavation was resumed at two sites - namely at Kandbhari Gate (fig.36) and Chirenath Temple (figs. 37-39).

Kandbhari Gate is located in the south-east of the fortified area of Mahet. The aim of excavation was to expose the entrance of fortification. Twenty one trenches were taken up for operation. A brick structure, eastern brick wall running towards the bastion is noticed just after the removal of humus in Trench K4 having a 9.40 m (length) x 2.05 m (width). It continued upto layer 4 having a height of 2.10 m and 42 courses. This wall is further noticed in the Trenches J3, H2, HI ZH1, ZJ2 with its total length 87.09 m, maximum and minimum width 3.60 m and 1.25 m respectively with its maximum height 2.10m and minimum height 0.30 cm and having forty-two maximum courses and three minimum courses of bricks. Three constructional phases of this structure has been encountered. A brickbat rammed floor is unearthed in the Trenches J5 and J4 which seems to be a pathway (pl. 133).

At the western side a brick wall running towards the bastion is noticed just after the removal of humus in Trench H5 having 4.3 m length x 2.56 m width. It continued upto H4, G4, G3 and G2 with its total length 39.2 m (pl. 134) and having its maximum width 2.56 m and minimum width 1.06 m repeated with its maximum height 3.10 m (62 courses) and minimum height 1.56 m (23 courses). In the western side the natural soil could not be traced due to high water level. Three constructional phases of this wall has been encountered. Another brick wall parallel to this western brick wall was traced in G3 and G4 trenches upto length 20 m and width 70 cm with maximum height 62 cm and minimum height 17 cm and maximum ten courses and minimum three courses. This wall was also traced in H5 trench with the length of 3.43 m, width 67 cm, and height 82 cm having sixteen courses. The sizes of cells are 5.6 x 1.97 m, 3.65 x 2.3 m. Sizes of other cells were not traced out due to high water level. A remains of outer entrance has been traced in J4, J5, K4, K5 trenches. In Period I, the entrance door was 3.94 m wide. In Period II, this entrance door widened upto 6 m and in Period III, it was paved with brickbats and this was widened upto 11.15m.

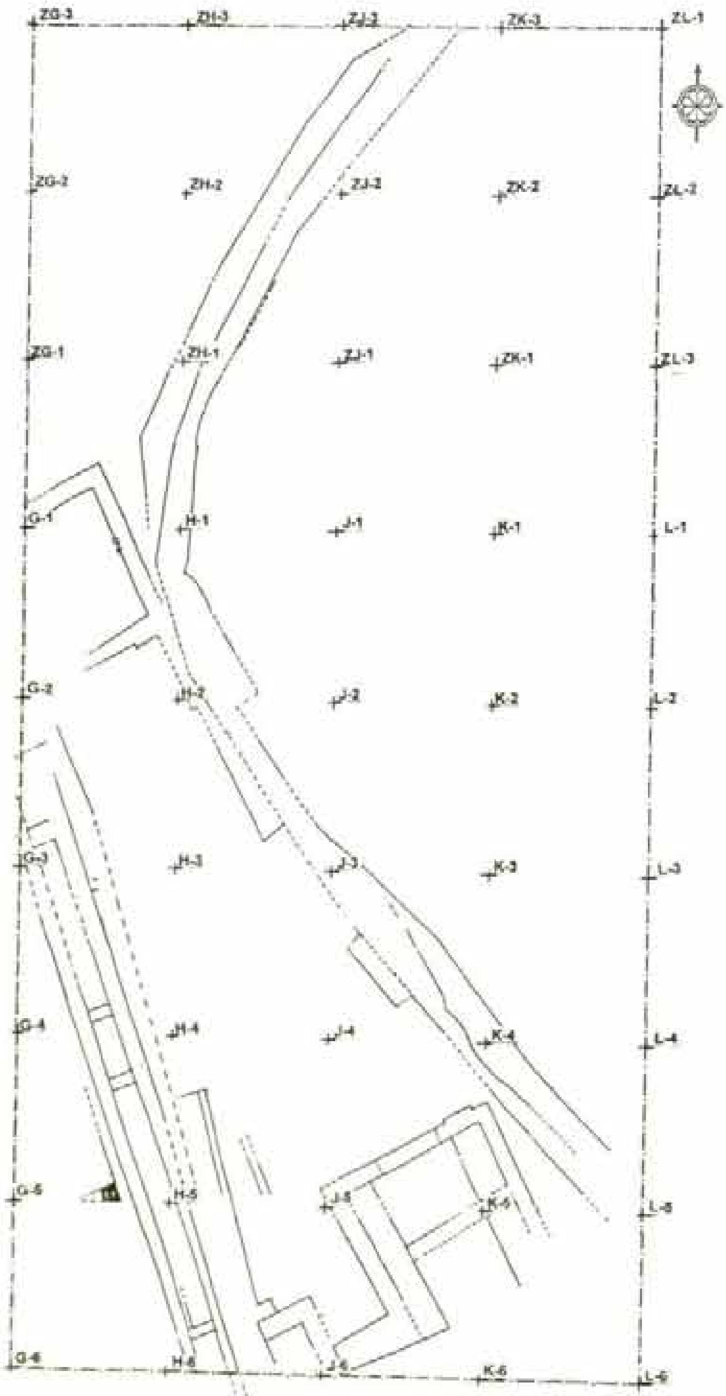
Remains of inner entrance have been traced in ZG1 and Gl trenches, brick walls found in channel shape. The brick wall towards north-west to south-east alignment has 9.10m length and 2.11 m height with thirty-four courses. Two post-holes were also traced adjoining this wall. Rest two walls which meet at 90° angles at the end of this wall have4.10mlength x 1.38mwidth x 0.18mheight (three courses).

Four varieties of ceramic industries are noticed in the Period I—pre-Kushan and Kushan (first century BC-third century AD) which include (i) red ware (ii) grey ware (iii) black ware and (iv) degenerated NBPW.

Red ware is dominating in percentage. It is well fired and devoid of any surface treatment. The fabric ranges from medium to fine. Bowl with ring

Fig. 36

KEY PLAN OF KUNDBHARI GATE (MAHETH) SRAVASTI 1997-98



NOT TO SCALE

Fig. 37

PLAN OF CHIRENATH TEMPLE 1997-98
PERIOD : II

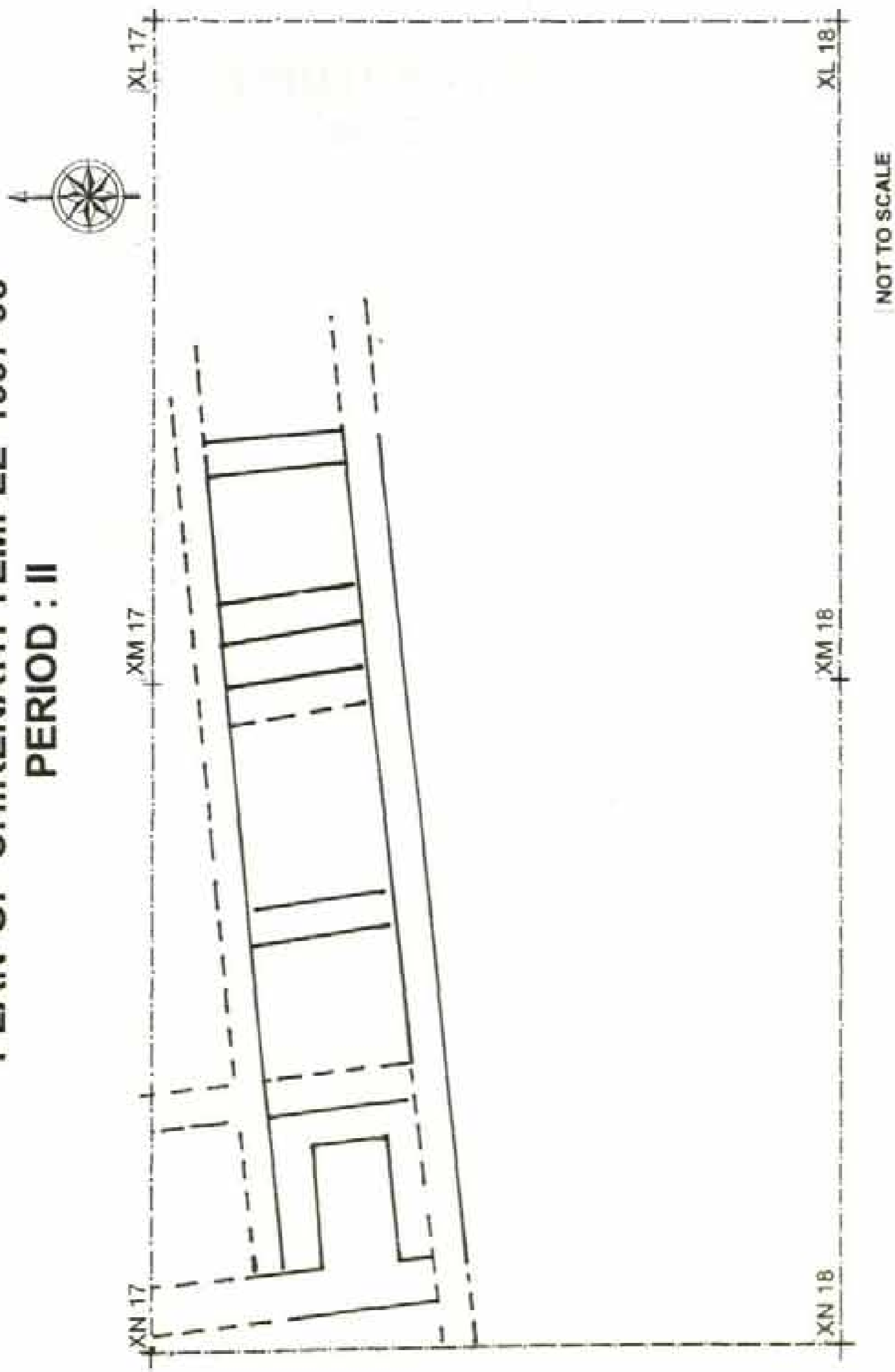


Fig. 38

PLAN OF CHIRENATH TEMPLE 1997-98
PERIOD : III

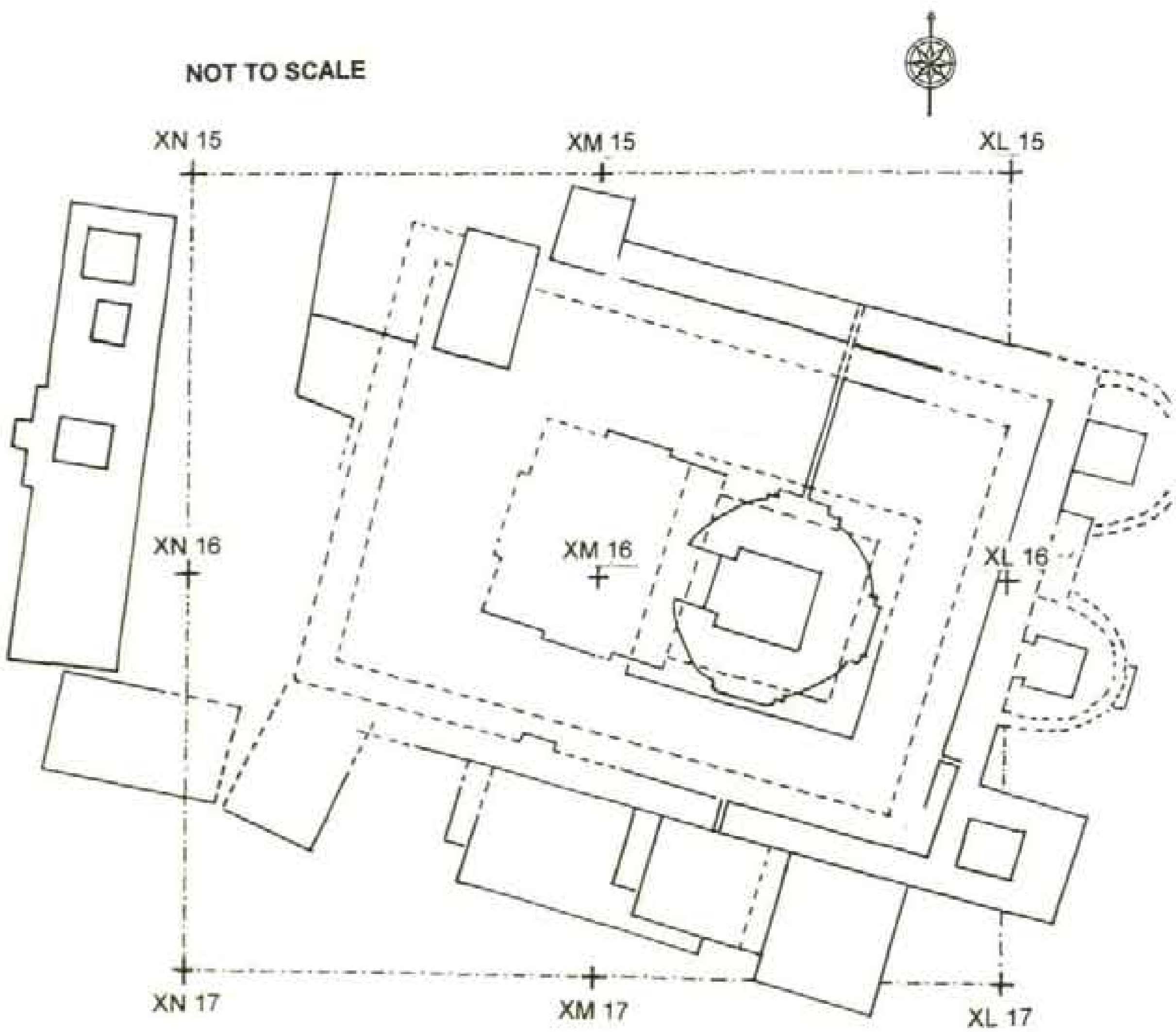
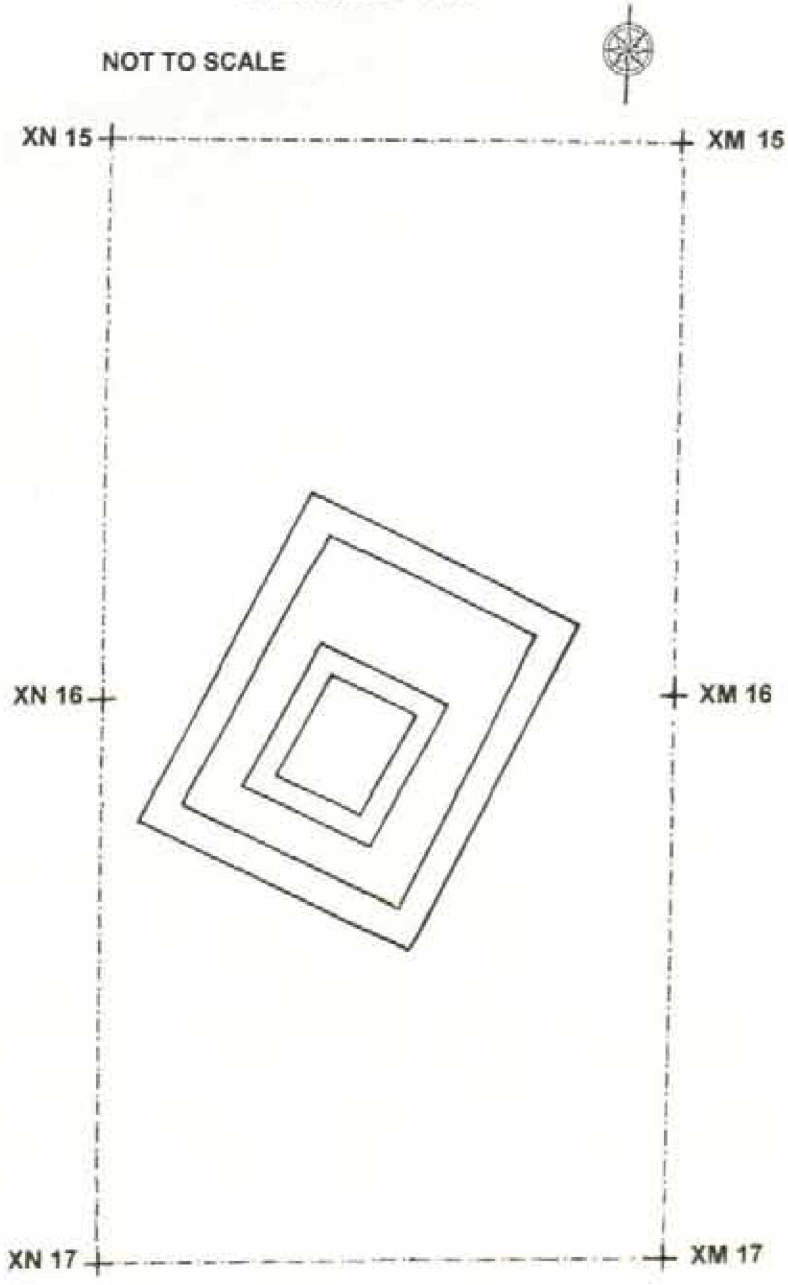


Fig. 39

PLAN OF CHIRENATH TEMPLE 1997-98
PERIOD : IV

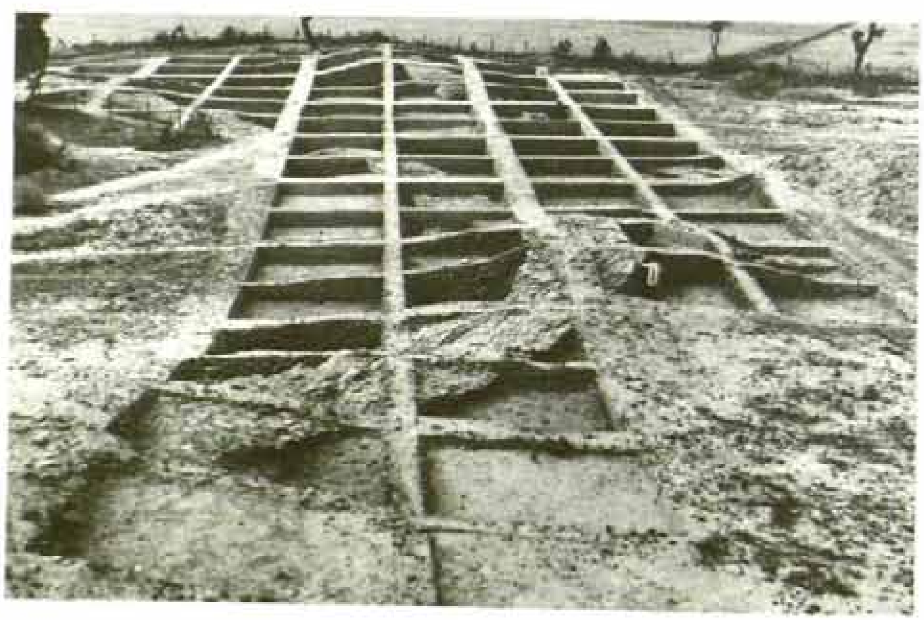
NOT TO SCALE



PLATES 133-134



133



134

Sravasti : 133, *brick-paved pathway;* 134, *view of enclosure-wall from north*

cup base, miniature bowl, sprinklers, vase with vertical externally thickened rim, out-turned rim are found in red ware.

Percentage of grey ware is limited in quantity. It is well fired with fine fabric and blackish grey to ashy grey in shades. The types include bowl and dish only.

The quantity of black ware is lesser than grey ware. It is well fired, fine fabric and treated with slip. Deep bowl and dish types are encountered in this layer.

Degenerated NBPW is very less in quantity. It is well levigated clay and thicker in section. Only bowl type is represented.

In Period II, only red ware is noticed. It is well fired and fabric ranges from medium to fine. This period is represented by Gupta and late Gupta deposits. The fabrics can be classified in two groups (i) slipped and (ii) dull red. Thick brick red slip is treated externally and internally restricted to rim portion. Bowl with featureless rim and flat base, ink pot-lid type, basin, miniature vase with an out-turned featureless rim, a sharp carination above flat base, sprinkler and spout.

Period III (early medieval) is marked by the presence of red ware. Fabric ranges from medium to coarse and it is devoid of any surface treatment. The types represented in this ware are predominantly vases of different sizes. Few pots are ill fired showing the unoxydized smoky core.

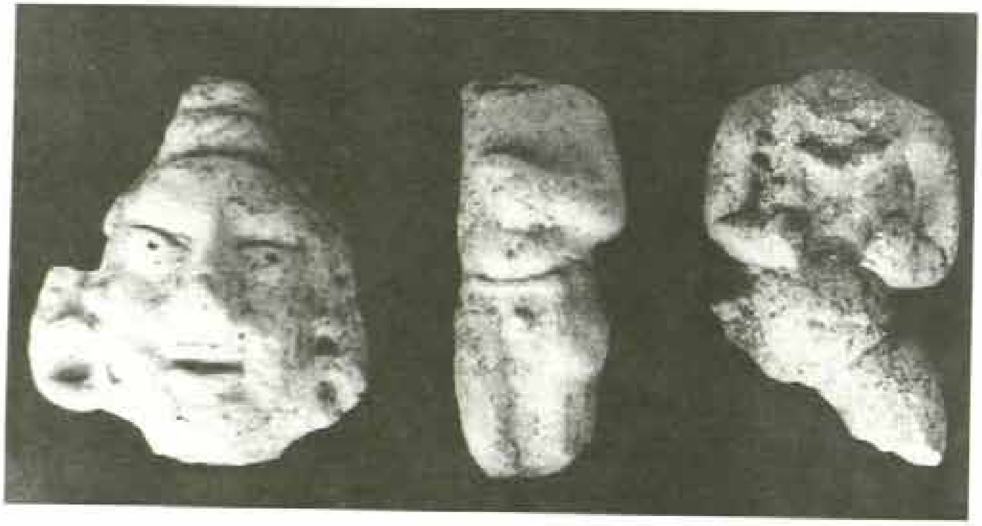
Among the one hundred and three antiquities recovered during the excavations, mostly are iron nails, fragments of arrow-heads and spear-head, terracotta skin-rubbers, sling balls, animal and human figurines (pl. 135),coins, copper antimony rod and ear-ring and bone stylus. At the upper layer some muslim copper coins have been found.

Chirenath Temple is located on a small mound, outside the fortified area of Maheth, west of village Kandbhari and about 150 m south-west of Kandbhari Gate. The mound covers roughly an area of 40 m x 30 m. Eastern and northern part of this mound have been destroyed by the local villagers by converting it into agricultural fields as potsherds and brickbats are found scattered on the surface of these agricultural lands.

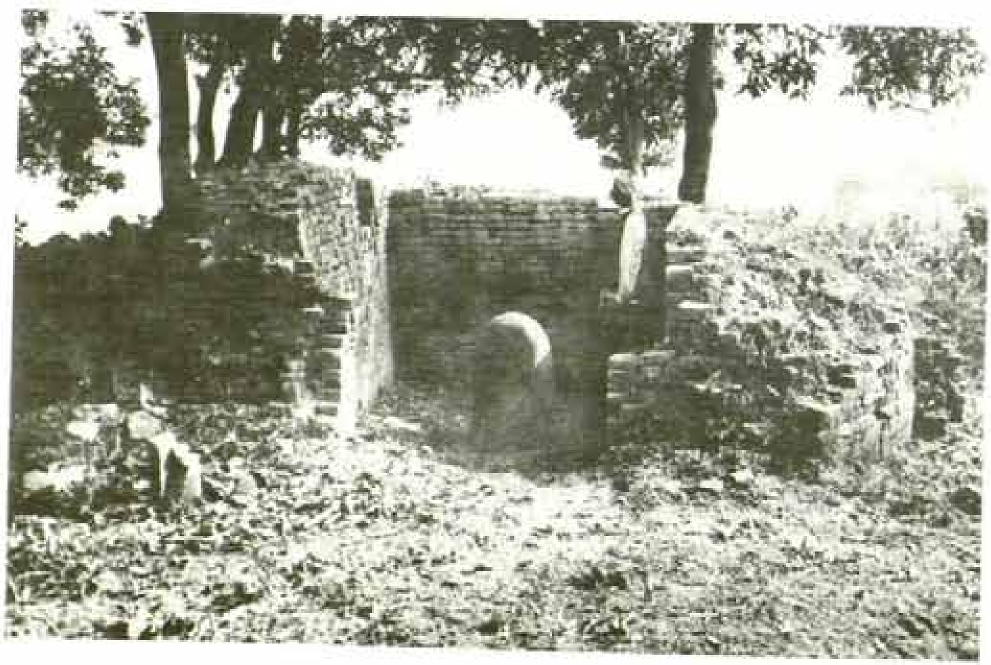
The height of the mound is not more than 2 m from surrounding plain, on which the temple of Chirenath had been constructed. Presently, the villagers call this temple Mahadeo-than. The temple is built of burnt bricks. Moulded and decorated bricks have been used for construction of this temple.

From outside, the temple is circular upto its *jangha* portion. The *sikhara* is completely missing. The circumference of the temple is 14.70 m. The remains of three niches, in all the three cardinal directions excepting west, have been found on the outer wall of the temple. The entrance is from west. *The garbhagriha* of the temple is roughly square measuring 2.10 m x 2.10 m. A 1.70 m high Siva-*linga* of red sandstone is installed in the

PLATES 135-136



135



136

Sravasti : 135, *terracotta human figurines;* 136, *Chirenath Temple*

garbhagriha. Two flanks have been taken off from both the sides of the *linga,* probably named it as Chirenath (pl. 136).

In the excavation conducted at this site in grids of 10 x 10m each, six layers were encountered and the natural soil was found mixed with *kankar* in which further probing could not be done as water level has come up to it now.

The evidence of material culture recovered from excavation in this area has been tentatively divided into four cultural periods:

Period I	*Circa* early second century BC to end of first century
Period II	*Circa* first century AD to fourth century AD
Period III	Early medieval period
Period IV	Late medieval period

The ceramic industry of Period I is marked with the presence of red ware, black ware and grey ware. In red ware the fabric ranges from coarse to fine. It is well fired and devoid of any surface treatment. The types include vase, basin and miniature bowl. The black ware group is minimum in percentage. The type includes only bowl and miniature bowl. It is of medium fabric, well fired and treated with thin slip. Grey ware is of fine fabric and well fired. Only bowl and flat dish are encountered. The texture of this ware is marked by ashy grey, both exterior and base are of dull black.

No antiquity and structural activitiy could be traced in this level, probably because the area of excavation was very limited (4.24 m x 2 m).

The evidence of flood in River Rapti has been obtained in the form of thick layer of 1.60 m of yellowish sand above the deposit of this period.

Layers 3 and 4 represent Period II. The structural activities of this period were found in Trench XN17, Qd 1 and 2 and XM17 Qd 1. Structures are in the form of ruins of small cells. Total five cells are fully or partly exposed. In the Trenches XN17 and XM17 there were no structures of later period. The extension and remaining part of this cell-complex buried under the structures of Periods III and IV might be a part of some monastery. The cells measure 1.45 m x1.65 m, 2.40 m x 2.80 m, 1.93 m x 2.39 m and 2.06 m x 1.90 m. The bricks used for constructing these rooms measure 33 x 23 x 6 cm, 32 x 23 x 6 cm and 32 x 23 x 6 cm.

This period has yielded only red ware. They are well fired and treated with wash. The fabric ranges form medium to fine. The types include dish, bowl with inturned rim, vase, storage jar, ink-pot type lid, earthen lamp, sprinkler, bowl with handle. Sprinkler is of fine fabric and treated with thin red slip which is washed out due to water loging. In the case of storage-jar, husk and gritts are mixed as tempering materials.

Among the antiquities, terracotta animal figurines, human figurines, wheels, beads, skin rubber and bangle pieces have been found. Pieces of glass bangle were

PLATES 137-140



137



138



139



140

Sravasti : 137, *Vamana;* 138, *Vishnu;* 139, *Vishnu;* 140, *Uma-Mahesvara*

also recovered. Noteworthy among the antiquities is a corroded copper coin of Kanishka of standard type with greek legend and standing king on the obverse while Greek deity *Nanaia* on the reverse.

The Period III is marked by the construction of a very well-planned temple-complex. Structural activities of this period can be divided into two phases. In this period one temple was constructed which was enclosed with a wall from all the three sides except west from which entrance has been provided. The remains of this enclosure wall have been found in the northern side upto a length of 13.22 m. The thickness of this wall is 95 cm. hi the eastern side 11.90 m long and 85 cm wide enclosure wall is traced, while in the southern side 12m long wall has been traced. But the main shrine has not been exposed because in phase II, another temple (presently existing) was constructed on the ruins of earlier one. The brick sizes used in the enclosure wall are of 25 x 22 x 4 and 26 x 22 x 4 cm. Moulded bricks of earlier period have also been noticed at places.

In phase II of this period, once again massive structural construction activities have been done without disturbing the enclosure wall of earlier phases, probably because of transfer of ownership of this area.

The sculptures are made of very soft greenish sandstone. One fragment of door-frame depicting *dvarapala* and other fragmentary sculpture, probably of Vamana (pi. 137), made of black chlorite schist are also noteworthy finds of this peirod. Fragmentary sculptures of Vishnu (pis. 138-139) and Uma-Mahesvara (pi. 140) were also found.

The Period IV is represented by the remains of only one room of 5.65 m x 4.25 m. This room has been constructed by some priest when only the main temple was in worship. The other sub-shrines might have been covered with debris and earth. This room has been used for residential purpose as a square platform of 2.88 m x 2.88 m was exposed inside the room. The evidence of two hearths was found on this square platform.

69. EXPLORATION IN DISTRICT UTTARKASHI

The Regional Archaeological Unit, Pauri-Garhwal of the State Archaeology Department, Government of Uttar Pradesh, undertook exploration in upper Tons valley in District Uttarkashi. The exploration was conducted by B.P. Badoni, assisted by B.B.S. Rawat under the general direction of Rakesh Tewari inPurola tehsil.

Village/Site	*.Sature of remain* ;
Bari	Wooden temple
Bhitri	Wooden temple Datmeer
Wooden temple	

Village/Site	*Nature of remains*
Devra	Wooden temple, remains of medieval temples and sculptures
Dhara	Wooden temple
Doni	Wooden temple with profuse wood carving
Gangar	Wooden temple with *mandapas*
Guradi	Wooden temple
Hudyari	Three-storeyed wooden temple
Jakhol	Wooden temple with profuse wood carving
Kanyasani	Wooden temple
Khanana	Wooden temple
Kotgaon	Wooden temple
Kunara	Wooden temple
Masri	Wooden temple
Naitwar	Wooden temple, remains of medieval temples
Nanai	Remains of medieval group of temples

Village/Site	*Nature of remains*
Nuranu	Wooden temple
Osla	Wooden temple
PaunUpla	Wooden temple
PaunNichala	Wooden temple
Pujeli	Wooden temple
Satta	Wooden temple
Saur	Wooden temple
Sewa	Multi-storeyed wooden temple
Sindri	Wooden temple
Sirga	Wooden temple

70. Excavation at Chaukhandi Stupa, Sarnath, District Varanasi

Muhammed K.K., assisted by D.P. Sinha, K.C. Srivastava, P.K. Tripathi and S.K. Arora of Patna Circle of the Survey, carried out excavation work at Chaukhandi stupa mound in Sarnath. As per the excavations by Cunningham and Oertel, this lofty brick structure of Gupta period consists of three square terraces raised one above the other. Five trenches measuring 10 * 10 m in the south-east comer of the mound have been taken up with a view to expose the plan of the stupa for the purpose of its restoration and consolidation for giving it a proper shape. The diggings have exposed the traces of 1.30 m thick outer walls of the terraces and 1.10m thick cross walls forming boxes to be filled with earth. A few red ware sherds of vases and bowls, two spouts and one knob have been recovered. Terracotta sling balls, beads and one sandstone *pranala* have been found in the excavation.

WEST BENGAL

71. EXPLORATION IN DISTRICT BANKURA

S.B. Ota, assisted by S.Maiti of the Calcutta Circle of the Survey, conducted exploration at Patalpur and Damodarpur in Onda and Bishnupur Police Station to ascertain the tool bearing horizon in the area. This is half kilometre away from the left bank of Darakeswar river, on the road between Bishnupur and Ayodhya Via Dharapat. Implementiferous horizon is half a metre below the present surface which is a stabilised detrital laterite bed and is very hard and exposed at places. The overlying sediment is reddish sand. Below the detrital laterite there is a yellowish clay deposit. The composition of detrital laterite bed, 2 m in thickness, shows that this has been deposited due to high energy surface wash. The artifacts, though sporadic in nature, come mostly from the top of the stabilised secondary laterite. The artifacts, comprising blades and flake-blades, are mostly on chert and quartz. Few quartz and well-rounded cobbles have been noticed which suggest its presence through import from some river bed. The nearest source for chert is not yet known but the source of quartz can be faraway from the locality as besides the laterite pallets the other overwhelming stones in the detrital laterite are quartz. To save the area from evergoing process of soil erosion the Forest Department has undertaken the work of deforestation here.

72. EXCAVATION AT PAKHANNA, DISTRICT BANKURA

In continuation of the previous season's work *(1996-97,* pp. 177-180). excavation was resumed at Pakhanna, by the Department of Archaeology. University of Calcutta, under the guidance of Chitrarekha Gupta, assisted by Anil Chandra Pal, Mallar Mitra, Asok Datta and others.

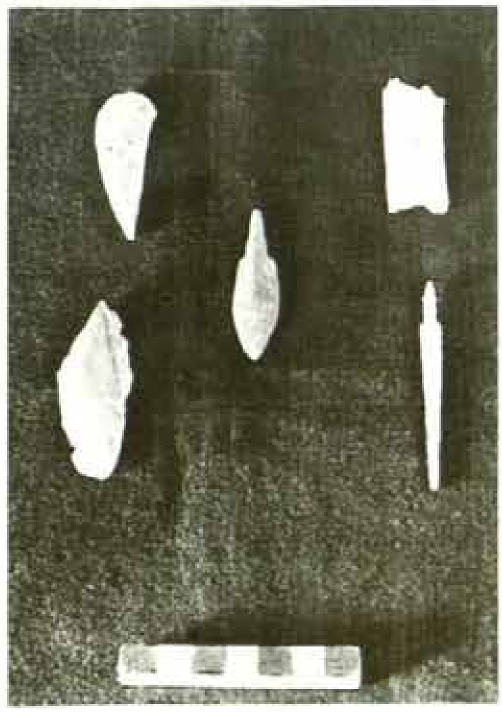
Apart from imparting training to the post-graduate students of the Department in the field archaeology, other archaeological problems were also considered. The work was mainly concentrated at the Bhairav-danga mound (BD1) because the last year's results yielded material belonging to the Chalcolithic phase along with those of the historic period, while the Gader-danga area yielded assemblages only of the historic period. The excavation in this area was done to determine (1) the chrono-cultural development of the Chalcolithic phase; (2) the nature and character of transition from the Chalcolithic to the historic phase, and (3) extent of settlement area of the Chalcolithic people.

With these objectives in view, two horizontal trenches of 6 x 6 m (A2 and A3) were first taken up in BD1 area. Then one more trench (A/2) was taken in the same area, but it was partially exposed. The Chalcolithic level yielded, as in previous year, wheel-made painted and plain black-and-red ware, black on red ware, painted brown ware, black ware and red ware. Bowls, basins, jars are common types. Jars or *kalasas* with beaded designs deserve mention (pl. 141). Bone tools including ordinary and sophisticated socketed arrow-head and points (pl. 142). beads of stone and bone, copper rings have been found along with Chalcolithic ceramics. Iron tools like chisel and arrow-head have been found from the upper level of the Chalcolithic phase (pl. 143). One trench (A2) has yielded a small Neolithic celt, but it

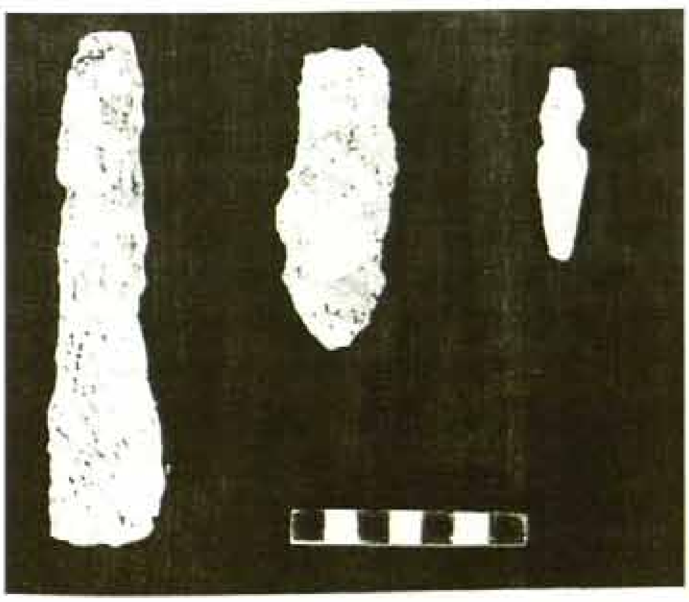
PLATES 141-143



141



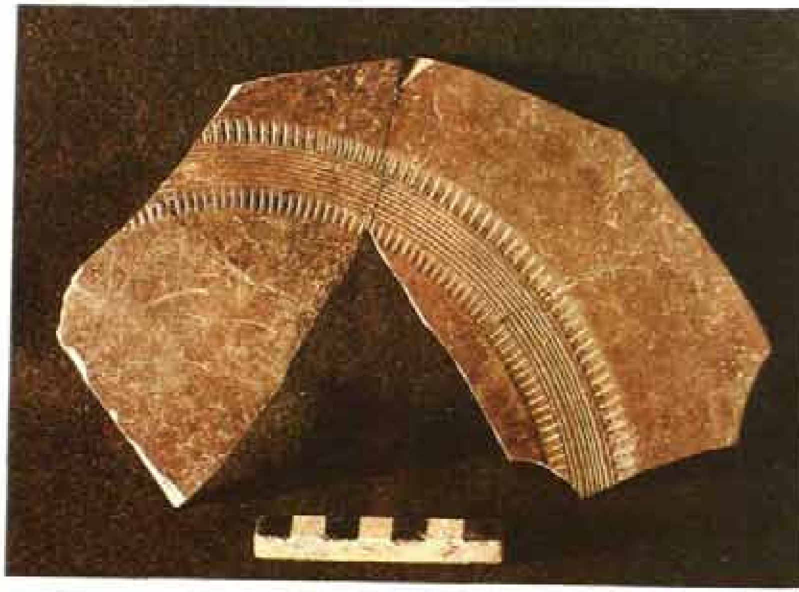
142



143

Pakhanna : 141, *jar with beaded design;* 142, *bone tools;* 143, *iron tools*

PLATES 144-145



144



145

Pakhanna : 144, *sherd of Rouletted Ware*: 145, *fragmentary stamped pottery*

has been obtained from a pit of the Chalcolithic period. Two more Neolithic celts have been found this year, one from surface collection and another from an excavated trial-trench. No clear Neolithic or Neolithic-Chalcolithic phase has yet been traced.

Because of the very disturbed nature of the site, the picture of transition from the Chalcolithic to the historic phase is still very hazy. But two pieces of NBPW and the predominant black-polished ware point to the flourishing stage of the site during the third century BC. The beautiful Rouletted Wares (pl. 144), stamped pottery (pl. 145), terracotta figurines show gradual development of the site around first century AD. But later developments cannot be traced at Bhairav-danga.

From structural evidence unearthed, the process of development, however, could not be ascertained. Three floor levels have been obtained, two of them belong to the Chalcolithic phase. All are mud floors. One circular structure belonging to the Chalcolithic period has been found in Trench A2 at a depth of 1.25 m. The outer diameter of the structure is 2.60 m and the inner diameter is 2.30 m. Two post-holes have been traced. Another rectangular floor with post-holes has been found in A3 at a depth of 1.67 m. In none of the trenches excavated this year anything like "pit-dwelling" of previous year has been found. No brick structure of historic period has yet been traced. This may be due to extensive brick-robbing at the site.

In order to have an idea about the extent of Chalcolithic settlement area on the Bhairav-danga mound, three trial-trenches of 2 x 2 m were taken at three points of the mound. It appears that the Chalcolithic people lived almost all over the Bhairav-danga mound. Then there was a gap and another cluster of settlement grew up in the Satbardanga mound, where black-and-red wares have been found from the surface collection.

In order to understand the cultural sequence of Satbardanga mound one trench was taken up. Here Chalcolithic level could not be fully exposed, but the sequence seems to be the same as in the Bhairav-danga mound. Here Gupta moulded pottery was found in the upper level.

73. Exploration in District Midnapore

In continuation of the previous season's work *(1996-97,* p. 180), Santanu Maiti of the Calcutta Circle of the Survey, carried out village-to-village survey in the area confined to Contai Police Station and brought to notice the following sites of archaeological importance.

Village	*Nature of remains*
Anuraibeliachatta	Temple datable to late medieval period
Aurai	Medieval mound and two temples of late medieval period

Village	*Nature of remains*
Bidhubahiri	Medieval mound and a temple datable to *circa* nineteenth century AD
Haturia	Brick-built signal post, datable to *circa* nineteenth century AD
Herranamaldina	Flat-roofed brick temple, datable to *circa* eighteenth century AD
Karpura	Two temples datable to *circa* eighteenth-nineteenth century AD

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS

ANDHRA PRADESH

1. EASTERN CHALUKYA COPPER-PLATE CHARTER, KAKINADA, DISTRICT EAST GODAVARI

This charter discovered from the village Peddapurappadu, now preserved in the ASPP Museum at Kakinada, is written in Sanskrit language and Telugu-Kannada script of ninth-tenth century AD. It records the gift of the village Kakandiparru in Ashtami-vishaya to a Jinalaya on the occasion of the Jaina pontiff Kanakanandyacharyya attaining Dharma-pada by Chalukya king Vishamasiddhi, son of Indra-bhattaraka of the Vengi country for the merit of his father and for his ownself. The seal of the charter reads *'Sri Vishamasiddhi.'*

2. EASTERN CHALUKYA COPPER-PLATE CHARTERS, HYDERABAD, DISTRICT HYDERABAD

Three copper plate sets are preserved in the Andhra Pradesh State Archaeological Museum, Public Gardens, Hyderabad, Andhra Pradesh. The first charter is in Sanskrit language and engraved in Telugu-Kannada characters of sixth-seventh century AD. Issued on the day of lunar eclipse during the fifth year of the king Vishnuvardhana-maharaja, son of Sarvvalokasraya and the grandson of Vishnuvardhana-maharaja, it records the gift of the village Kondakali (Kondakaripuramu) situated in the Adhi-vishaya to a brahmin Nandisarmma of Khandi (Kaundinya?) gotra and the resident of Vemgipura by the king. The charter contains a seal which reads: *'Sri Vishamasiddhi.*

Of the second copper-plate set which is supposed to have contained four plates, the first plate is missing while the second one is fragmentary, retaining only a quarter portions. There is no inscription engraved on the second side of all the three plates and the ring with the seal attached to them does not bear any emblem or legend. The inscription is engraved

[1]Information from: M.D. Sampath, assisted by M. Jayarama Sharma, C.A.Padmanabha Sastry and Jai Prakash, D.M. Nagaraju and K. Karuppaiah, S. Rajavelu, who found, examined and reported nearly two hundred seventy-eight inscriptions of which only the important ones are mentioned here.

in Sanskrit language and Telugu-Kannada characters and refers to the king [Jaya] simha-vallabha-maharaja probably Eastern Chalukyan king (AD 641 -73).

The inscription seems to record a tax-free gift of a village called Uchchatigrama situated in Natavati (vishaya) to a brahmin Matri-sarmma son of Dvivedi Durgganandi-sarmma, a resident of Va(Vem)giparru belonging to Kanvasa-gotra, Apastamba-(sutra) on the day of Vaisakha Purnima and Vyatipata.

The third set, which has three plates in Sanskrit language and Nagari characters of eleventh century AD dated in Saka 962 AD 1040 *{netra-rasa-samkhya)* in chronogram, it records the gift of an *agrahara* named Daru situated in Vengi-vishaya on the occasion of solar eclipse to a brahmin Narayana of Haritasa-gotra, by king Vishnuvardhana of Chalukya family.

3. VLJAYANAGARA COPPER-PLATE CHARTER, HYDERABAD, DISTRICT HYDERABAD

A copper-plate charter found preserved in the Andhra Pradesh State Archaeological Museum at Hyderabad, Andhra Pradesh, is written in Sanskrit and Kannada languages and Nagari characters belonging to the reign of Vijayanagara king Harihara. Dated in Saka 1308 (AD 1386), it registers the grant of a village called Vidyaranyapura, named after Sri Vidyaranya to the *mahajanas* of Sringeri, on his attaining *samadhi (paripurnaradalli)*. The gift divided into hundred *vrittis* was made after purchase for a sum of five hundred *varaha-gadyana*. The above lands are situated in Kikkinda-nadu in Aragada-vemthe.

4. IKSHVAKU COPPER-PLATE GRANT FROM KALLACHERUVU, DISTRICT WEST GODAVARI

A'set of five copper-plates discovered from the above mentioned place, presently kept in the ASPP Museum at Kakinada, District East Godavari, engraved in Prakrit language and southern Brahmi characters of third-fourth century AD belong to the reign period of the Ikshvaku king Ehavula Chantamulavarmma who had performed *asvamedha* and *hiranyakoti* sacrifices. Dated in Samvat year [4], Hema 6 and day 8, the inscription refers to the construction of a Chatusala (quadrangular-hall) to the Mahavihara for accommodating mendicants and pilgrims as a resting place (*Vissamanattam),* and records the grant of land as a permanent endowment *(akkhaya-nivi)* towards the maintenance of the same situated around township near the Mahavihara at Pithunda. The grant was stated to have been made by the king from his victorious camp Samnakadata for accruing merit and attaining longevity and strength *(punnap-payan-ayu-bala-vaddhanattam)* and the order was issued by *Mahatalavara* Aggasura.

5. VISHNUKUNDI COPPER-PLATE FROM KALLACHERUVU, DISTRICT WEST GODAVARI

Another charter with a set of seven copper-plates discovered from the above mentioned village, also kept in ASPP Museum at Kakinada, District East Godavari, is in Sanskrit language and in southern Brahmi characters of about the early sixth century AD. Dated in the 26^{th} year and 8^{th} day of Hemanta, it belongs to the reign of Vishnukundi king Madhavavarmma, son of

Govindavarmma, both being described as performers of a nulmber of sacrifices like *asvamedha, bahusuvarna, paundarika,* etc. The inscription states that at the orders of the king, his son Vikramendravarmma, who was in-charge of Trikalinga-Vengi-vishaya, made grant of land in the villages. Undichchishti, Dalava, Kadurukuttu and Kadukapu and in villages of Klochela and Kloyura in Vengi-vishaya along with the privileges of *achata-bhata-pravesha* to the Trilokasraya-raja-mahavihara of Asanapura towards the repairs and maintenance, for accommodating and feeding of the members of Aryyasamgha who come from the four directions and for the benefit of the visiting monks of the Mahavihara of Tamra-parnni (Ceylon). It is interesting to note that Vikramendravarmma who was known to have born to Vakataka princess was described as *Vishnukundi-Vakataka-kula-dvaya-lalama.*

KARNATAKA

6. Hoysala Inscription, Halgur, District Mandya

This damaged inscription in Kannada language and characters belonging to the reign of Hoysala king Vishnuvardhana (AD 1104-41), records the grant of land in the village Halaguru for worship, food offerings, for temple servants and also for burning a perpetual lamp in the temple of god Svayambhu Vaijanatha at Narasingha-chaturvedimangalam by a *mahapradhana* (name lost). The grant was stated to have been engraved on a copper plate and was entrusted to the senior pontiff *(hiriya-gurugalu)* named Sambhu (deva).

MADHYA PRADESH

7. Inscription, Damarauna Kalan, District Shivpuri

Engraved on stone- slab and dated (Vikrama) 1787 (AD 1730), this inscription in local dialect and Nagari characters records the construction of a temple of Rama-Lakshmana probably by Maharaja Kumara Divanathana-sighaji.

8. Inscription, Vidisha, District Vidisha

Engraved on the pedestal of Panchamukhi Siva-*linga* and dated [Vikrama] 1276 (AD 1219), this inscription in corrupt Sanskrit language and Nagari characters, records the installation probably of the same *linga.*

TAMIL NADU

9. Hoysala Inscription, Mosakkuttivalasu, District Erode

This damaged Tamil inscription is engraved on a loose stone-slab kept in front of Alagunachchi Amman Temple. Dated in the cyclic year Dhatri (AD 1336) and belonging to the period of Hoysala king, Vira Vallaladeva (Ballala III), it seems to refer to the installation of Devi (goddess) and construction of a temple in the village Vayiranpalli *alias* Uttamacholach-chaturvedimangalam in Virasola-valanadu.

10. Memorial Stone-Inscription, Tamaraikkarai, District Erode

This fragmentary Tamil inscription engraved on a broken stone slab in early Vatteluttu characters of fifth-sixth century AD, mentions the name Karimidachchattan.

11. CHOLA INSCRIPTION, KORATTUR, DISTRICT KANCHIPLRAM

This inscription in Tamil language and characters, is engraved on a pillar of the *mandapa* of the temple of Mariyamman in the village. Dated in the twelfth regnal year (AD 997) of Chola king *Salai kalamarutta* Ko-Rajakesari, i.e., Rajaraja I, it registers the sale of land along with water facilities as *devabhoga,* after making it free from taxes to the temple of Sembiyan Mahadeva-isvaram in the village by the *sabha* of Kurattur *alias* Sri Parantakach-chaturvedimangalam in Ambattur-nadu of Pular-kottam.

12. PANDYA INSCRIPTIONS, VAUKANDAPURAM, DISTRICT PERAMBALUR

This Tamil inscription is engraved on a slab built into the platform of the *prakara* in the temple of Triuvalisvaram-udaiyan at Valikandapuram. Dated in the 12th regnal year (AD 1308) of the Pandya king Jatavarman Vira Pandya, it records the construction of a drama-stage *(tiruvad-arangu)* probably for holding cultural activities and the (tiruppalliyarai) inside the temple of Tiruvalisvaram-udaiyar located at Kilkurru-Valikandapuram of Venbar-nadu by one Tiruvaiyarudaiyan Villimagadarayan *alias* Irungolan, who had the rights of *kudininga tirunamattukkani* of the village and a resident of Brahmadesam *alias* Tiruvabaranamitta-perumanallur.

13. TAMIL INSCRIPTION, SATYAMANGALAM, DISTRICT PUDUKKOTTAI

This inscription engraved on a stone-slab near the sluice of a tank outside the village, is in Tamil language and characters of about thirteenth century AD. It refers to the construction of a sluice by Palai Tirup-peruman *alias* Mudikondasola Nadalvan.

14. CHOLA INSCRIPTIONS, PERUNGULAM, DISTRICT TIRUNELVELI

This Tamil inscription, engraved on a slab set up on the floor of the *ardha-mandapa* in the Mayakkuttaperumal Temple belongs to 43rd regnal year (AD 1113) of Chola king Kulottunga I. It begins with his usual *prasasti pugal-madu vilanga* etc., and mentions the village Perungudi *alias* Uttamacholanallur included in Mudikondachola-valanadu, a sub-division of Raj araj apandi-nadu.

15. TAMIL INSCRIPTION, THIRUKKURUNGUDI, DISTRICT TIRUNELVELI

This inscription engraved on the south wall of *prakara* of the Tirupparkadal Nambi Temple, is in Tamil language and characters. Dated in Saka 1293 (AD 1371), it refers to the row or division *(patti)* measuring three span *(mulam)* and to an individual Sri Krishna - bhattan, a native of Imampuliyur in Chola-mandalam.

16. CHOLA INSCRIPTION, KALANIPAKKAM, DISTRICT VELLORE

This inscription, in Tamil language and characters of the thirteenth century AD belongs to the reign of Chola king Rajaraja (Rajaraja III). Dated in the eleventh regnal year (AD 1227) of

the Chola ruler Rajaraja III, it states that the *sabha* of Kalanippakkam in Miyarai-nadu in Paduvur-kottam had made provisions by setting apart 1240 *kuli* of' *parivattanai* land for burning a lamp and for providing food offerings in the temple of Bhimesvaradevar of Kalanipakkam. The above mentioned land was stated to have been acquired through exchange and sale of land.

17. Pandya Inscription, Toppalakkarai, District Virudhunagar

This inscription, engraved on the *balipitha,* fixed in front of the Perumal Temple is in Tamil language and characters. Dated in the third regnal year (AD 1271) of the Pandya king Sri-Kulasekharadeva, it refers to the construction of the *balipitha* by an individual named Irattaimavan *alias* Tamil (da) raiyar.

ARABIC AND PERSIAN INSCRIPTION

ANDHRA PRADESH

1. Qutb Shahi Inscription, Badshahi Ashur Khana, District Hyderabad

This beautiful inscription in the medallion form, executed in Thulth characters, on the western wall of the *Badshahi Ashur Khana* at Hyderabad, records only the name of the king 'Abu'l Muzaffar Sultan 'Abdullah Qutb Shah', whose ruling period extended from AH 1035-83 (AD 1626-72).

2. Asaf Jahi Inscriptions, Badshahi Ashur Khana, District Hyderabad

Among the four Persian inscriptions of Nawwab Mir Nizam 'Ali Khan Asaf Jah II (AH 1175-1218/ AD 1762-1803), photographed from the above mentioned Badshahi Ashur Khana at Hyderabad, the first one in three parts, records the erection (i.e., renovation of the Ashur Khana) by Nizamul Mulk Asaf Jah (II) for the sake of (Imam) Husain, in AH 1178 (AD 1764-65) while the second and the third inscriptions, simply record the name Nawab Mir Nizam Ali Khan Nizamu'l Mulk Asaf Jah Thani (i.e., the Second), along with the date AH 1178 (AD 1764-65). The fourth one, on wooden panels of northern and southern halls of the Ashur Khana, records the renovation of the decoration of the edifice, at the instance of Asad, the superintendent (of buildings), during the reign of Asaf Jah II, in AH 12(0)5 (AD 1790-91).

A seal housed in the museum at Idara-i-Adabiyat-i-Urdu, Panja Gatta, Hyderabad, pertains to the time of Mir Akbar Ali Khan Sikandar Jah Asaf Jah III (AH 1218-44 /AD 1803-29). Dated in AH 1219(AD 1804-05), the seal records the name of the official as Ashrafu'd Daula Ashraf Jang Mir Ali Husain Khan Bahadur, Fidwi-i-Asaf Jah (i.e., the devoted servant of Asaf Jah).

3. Epitaphs, Hyderabad, District Hyderabad

A good number of epitaphic records in Arabic and Persian have been copied from the famous

[1]Information from M.Ilyas Quddusi, assisted by M.Yaseen Quddusi, and G.S. Khwaja, of Epigraphy Branch of the Survey, Nagpur. One hundred and thirty-nine inscriptions were copied, examined and reported on during the year under review, out of which only important ones are mentioned here.

graveyard called Daira Mir Mumin and a couple of other epitaphs from elsewhere in Hyderabad, pertaining to the graves of dignified high officials, pious and learned personages, veteran generals and administrators. The names (in a couple of epitaphs names not mentioned) of the deceased along with their dates of death (in a few cases dates of birth also) include: Haji Siddi Raihan, AH 1055? (AD 1645); the headstone from the grave of Mir Shah Ali (brother of Mir Muhammad Mumin, the Prime Minister of Sultan Muhammad Quli Qutb Shah (AD 1580-1612) from the locality Purani Haveli, recording the date of death, AH 1058? (AD 1648) (pl. 146); Mirza Abu Turab Ridawi Mashhadi, with the pen-name Fitrat, AH 1060 (AD 1649-50) (earlier, partially copied as the bottom portion was cemented underground, and listed without date in *Annual Report on Indian Epigraphy (AREp),* 1975-76, App.D, No. 20; Khuda Wardi Sultan, AH 1061 (AD 1650-51); Mirza Yahya, AH 1089 (AD 1678-79); (pl. 147) the records (obverse and reverse) sides of the headstone from the grave of the wife of Mir Shah Ali, referred to above, present the dates of death of respected lady, AH 1091 (AD 1680) on the reverse and AH 1094 (AD 1682-83) on the obverse; Muhammad Husain alias Saf Shikan Khan Bahadur Mujahid Jang, AH 1128 (AD 1716) (partially listed, *AREp.,* 1967-68, App. D, No.55, without date as the lower portion was cemented underground); Sayyid Radi Mir Dauran Bahadur, AH 1216 (AD 1801 -02) who was born in AH 1199 (AD 1784-85); Sayyid Abu'l Qasim Mir Alam Bahadur, AH 1223 (AD 1808-09) who was born in AH 1166 (AD 1752-53); Nawwab Mir Abbas Ali Khan entitled Nizam Yar Jang, Nizam Yaru'd-Daula, Husamu'l Mulk, Husamu'l Umara, Khan-i-Khanan, the first, AH 1256 (AD 1840-41); Nawwab Mir Ghulam Husain Khan entitled Safdar Jang, Husamu'd Daula, Fakhru'l Mulk, the first, AH 1278 (AD 1861-62); Nawwab Bahbud Ali Khan Fathyab Jang, AH 1288 (AD 1871-72); Nawwab Sir Salar Jang I, AH 1300 (AD 1883) and his sons La'iq Ali Khan and Saadat Ali Khan AH 1306 (AD 1889).

4. Visitor's Records, Malkapur, District Nalgonda

Among the four records in Persian, photographed from Sarai Miran Masjid at Malkapur, two are in metrical form. The first one records that one Rafiud Din by name, on his way to Hyderabad, stayed here along with his children for a day on 16 Dhiqada AH 1280 (23rd April, AD 1864) and enjoyed rest and composure in the inn. The second one recounts that the court-personnel, of the District Nalgonda, comprising Qasim, the Mir Munshi, Muhammad Husain Khan, the translator, and two officials of the region - Sar Rishtadar of the Inam land and his Munshi (names not given), halted here for a day on Sunday, 4 Rabi II, AH 1287 (4th July AD 1870) during their travel. The visitor's record was written by Muhammad Husain Khan, the translator of the court, referred to above.

DELHI

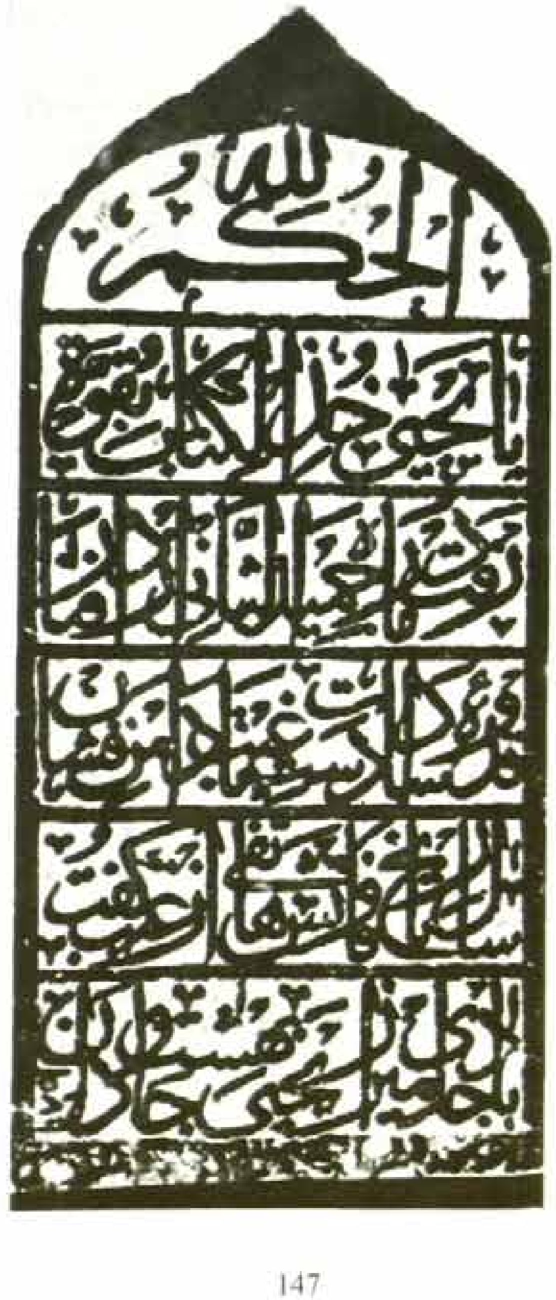
5. Mughal Inscriptions, District Delhi

Among the four photographed Mughal inscriptions in Persian, the first belongs to Jalalu'd Din Muhammad Akbar (AD 1556-1605), pertaining to the mosque called Khairu'l Manazil. It records

PLATES 146-147



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Hyderabad : 146, *epitaph from Mir Shah Ali grave;* 147, *loose epitaph from Mirza Yahya's grave*

the construction of the mosque by Maham Bega in AH 969 (AD 1561-62), through the efforts of Shihabu'd Din Ahmad Khan; the metrical text of the record, having been calligraphed by Niyaz Bakhsh and the slab obviously set up under the supervision of Darwish Husain.

The second Mughal inscription, pertaining to Shah Jahan (AD 1628-58), comes from the tomb of Shaikh Nizamu'd Din in Basti Nizamud Din, stating that Khalilu'llah Khan, son of Mir Miran al-Hasani Nimatu'llahi who was governor *(Hakim)* of Shahjahanabad (i.e., Delhi), constructed this pavilion round the blessed tomb in the year AH 1063 (AD 1652-53), during the reign of his Exalted Majesty Sahib-i-Qiran-i-Thani (i.e., Shahjahan).

The third Mughal inscription in metrical form from Sunehri Masjid near Red Fort, belongs to the reign of Ahmad Shah (AD 1748-54), assigning the construction of the mosque along with a well and a tank *(haud),* in AH 1164 (AD 1750-51), to Nawwab Qudsi Manzilat *{i.e.,* Nawwab Qudsiya Begam, the mother of the said king), with the efforts of Nawwab Bahadur Jawid (Khan). The composer of this inscription was Khurram.

The last Mughal inscription, from the balcony in front of Muthamman Burj in the Red Fort, represents the later Mughal, Akbar II (AD 1806-37), that registers the construction of the royal seat *(nashiman)* of exalted foundation meant for Akbar Shah, in AH 1223 (AD 1808-09). The composer of the metrical text of this epigraph was the poet-laureate *(Sayyidush-Shuara),* Sayyid.

6. Epitaphs, District Delhi

In the collection, there are four miscellaneous epitaphic records (later installations) in Persian, from the tomb-complex of Hadrat Nizamu'd Din and Qabrastan Mehndiyan in Delhi. Of these, the first one from the Nizamu'd Din tomb-complex, points to the grave as that of Hadrat Khwaja Sayyid Mu-i-(Tab), son of Hadrat Maulana Khwaja Sayyid Badru'd Din Ishaq Dehlawi and grandson *(nawasa)* of Hadrat Baba Faridu'd Din Ganj-i-Shakar and the spiritual disciple of Hadrat Khwaja Nizamu'd Din Auliya Sultanu'l Masha'ikh, whose death occurred in AH 735 (AD 1334-35). It also records that this inscription was installed in AH 1349 (AD 1930-31) by Hasan Nizami.

Among the epitaphs from Qabrastan Mehndiyan, the first one points to the grave as that of Hadrat Maulana Shah 'Abdu'r Rahim Muhaddith, son of Hadrat Maulana Shaikh Wajihu'd Din Muhaddith, who was born in the year AH 1054 (AD 1644-45) during the reign of Shahjahan and died at the age of seventy-six, during the reign of Farrukh Siyar in AH 1131 (AD 1718). It further records that the inscription was written by Muhammad Zubair son of Yusuf Chudiwalan of Delhi and (obviously) set up under the supervision of Ali Muhammad Sher Mewat, the *mutawalli* (i.e., in charge) of the Dargah. The second one pertains to the grave of Hujjatu'l Islam Hadrat Maulana Imam Shah Waliu'Uah Muhaddith son of Hadrat Maulana Shah' Abdur Rahim Muhaddith, who was born in AH 1114 (AD 1703) and died at the age of sixty-two in AH 1176, corresponding to (AD 1762), during the reign of Shah Alam II; the inscriber

and the supervisor being the same person, referred to above. The third epitaph belongs to the grave of Hadrat Maulana Shah 'Abdul' 'Aziz Muhaddith, son of Hujjatu'l Islam Shah Waliu'llah Muhaddith, who was born in AH 1159 (AD 1746-47) and died at the age of eighty in AH 1239 (AD 1824), during the reign of Akbar Shah ll.

UTTAR PRADESH

7. Miscellaneous Inscriptions, District Bareilly

Several inscriptions have been copied from different parts of Bareilly. Of these, the earliest one in Persian, comes from a local mosque, recording the completion of the mosque by Chand Khan in AH 1150 (AD 1737-38) for which obviously the work started in AH 1149 (AD 1736-37). Next is a later installation of an epitaph in Persian in Bagh-i-Inayat Khan in Mahalla Baqarganj, recording an obituary, saying that Nawwab 'Inayat Khan, eldest son of Mukarramu'd Daula Hafizu'l Mulk Hafiz Rahmat Khan Bahadur Nasir Jang passed away, following the disease of bladder-pain, at the age of thirty-two in AH 1187, corresponding to AD 1773 (irregular-should be AD 1774-February-March) and was buried at Bareilly. While a Persian inscription from Kala Imam Bada assigns the construction of a tomb *(Darih),* i.e., Imam Bada, to Husain Ali in AH 1204 (AD 1789-90). The bridge over Deoraina river, on its southern parapet-wall, bears a brief bilingual inscription (Hindi and Urdu), recording the name 'Diwan Bahadur Singh[7] along with the date 'AD 1842', obviously the builder of the bridge in the given year. Another Persian inscription in metrical form records the original erection of a mosque, termed as Masjid-i-Asaf (locally called Asafi Masjid) in AH 1211 (AD 1796-97) and its reconstruction in the year AH 1293 (AD 1876-77).

8. Miscellaneous Inscriptions, District Muzaffarnagar

Among the epigraphs copied, an epitaph in Persian from Jalalabad specifies the death of Shah Mazhar Ali in AH 1244 (AD 1828-29), further assigning the construction of the tomb obviously of the deceased, to Sayyid Muhammad Imam, son of Maulana Sayyid Shah Damin Ali.

Among the three worth mentioning epigraphs from Charthawal, the first one in Persian, assigns the erection of a mosque to one 'Abdu'l Hakim in AH 1173 (AD 1759-60). The second one, again pertaining to another mosque, assigns its construction, to Munshi Muhammad Karimullah, for which obviously the work started in AH 1263 (AD 1846-47) and came to an end in AH 1264 (AD 1847-48). The third one is a trilingual (Hindi, English and Urdu) record from Ram Mandir, fixed over the gate called Thakur Dwar. Dated in AD 1910 (Vikram Samvat 1967), its detailed Urdu version records that the old Thakur Darwaza (of the Hindu temple), built by Lala Rai Prem Raj in the time of Emperor Jahangir, was repaired in the time of Honourable Pandit Juwala Prashad, Collector, with the help of Maulawi Mushaffa Ahmad Siddiqi, Deputy Collector and Chief of Badaun *(Rais-i-Badaun).*

A metrical Persian record from Hasanpur Lohari, assigns the construction of a mosque, to one Nur Muhammad in AH 1261 (AD 1845).

NUMISMATICS AND TREASURE TROVE

GUJARAT

1. Gadhaiya and Roman Coins, Hathab, District Bhavnagar

The Department of Archaeology and Museums, Government of Gujarat, discovered Gadhaiya and Roman coins from the ancient port-town of Hathab.

2. Silver Coins, Doodhres, District Surendranagar

The Department of Archaeology and Museums, Government of Gujarat, reported the discovery of one hundred and fifty-five silver coins of sixth-seventh century (Valabhi period), bearing on one side bust of a king with Brahmi letters on the other.

KERALA

3. Gold and Copper Coins, Menalllr, District Thirivananthapuram

At Menallur near Kariavattom two gold coins and one copper coin along with a small ear-ring and an object of copper resembling a flower have been found during the renovation work of a very old Mahavishnu Temple by the Department of Ancient History, University of Kerala, Thiruvananthapuram. Similar gold coins were in use indigenously almost contemporary with the Roman coins in various parts of south India. These coins both of gold and copper do not contain any legend. However, symbols occur on both the sides (pls. 148-149).

The coins are very small and thin. On the obverse of the gold coin there is an *ankusa* and twelve zodiacal signs representing the solar year while on the reverse there is a *Vishnupada* symbol with the zodiacal signs. On the obverse of the copper coin there is the *Sri vatsa* symbol while on the reverse there are zodiacal signs. These coins have certain characteristics similar to that of Vijayanagara period. However, their presence with the Roman coins would indicate an earlier date.

There are graffiti marks inside the wall of the *garbhagriha* of the temple. Around the plinth there are bold reliefs of Mahalakshmi, Ganapati, serpentine motif, Elephant, Narasimha etc. The conical form of the wooden roof is a unique one which is not prevalent now in the wooden architecture of Kerala.

PLATES 148-149



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Menallur : copper coin and ear-ornaments

UTTAR PRADESH

4. Silver Coins, Kalyanpur, District Bareilly

The Agra Circle of the Survey, reported the discovery of fifteen coins in silver from the agricultural field at village Kalyanpur, Nawabganj tehsil, District Bareilly. These coins (pls. 150-151) were found to be of Muhammad Shah (AD 1719-1748), issued in his regnal years from 22-28. The coins are now in the possession of Nawabganj Police Station.

5. Silver Coins, Mawana, District Meerut

Coins numbering one thousand five hundred and sixteen in silver were found by the Agra Circle of the Survey during the course of reconstruction work at a house in Rani-Ka-Mahal, Parikshitgarh, Mawana tehsil. The coins were examined by a team from the Agra Circle and Epigraphy Branch, Nagpur, of the Survey and found to be of Alamgir II (AD 1759-1806) with various mint-places *viz.,* Bareilly, Varanasi, Ahmadnagar (Farrukhabad) and Shahjahanabad (Delhi). The coins (pls. 152-153) are now in the possession of Tehsil Treasury, Mawana.

WEST BENGAL

6. Metal, Wooden and Stone Objects, Calcutta

A large number of antiquities were examined by A.K. Bandyopadhyaya and S. Maiti of the Calcutta Circle of the Survey, which were in the possession of the Assistant Commissioner of Customs, Customs House, Calcutta. These objects include stone images of Durga, Vishnu, Navagraha panel, Surya (pl. 154), Nayika, Buddha, metal images of Radhika, Maitreya, bust of a lady (pl. 155), Buddhist male and female deities, etc. Other objects include ornamental footed metal vessels, copper bell (pl. 156), ornamental spoons, huge earthen storage-jar, wooden board ladden with semiprecious stones and images of Durga, Lakshmi, Hanuman, etc. Subsequently out of these objects, thirty objects were acquired by the Calcutta Circle from the Customs authorities.

7. Metal Images, Calcutta

The images which were seized by the Assistant Commissioner of Customs, Calcutta, were examined by the officials of the Calcutta Circle of the Survey. Images of Nataraja and a four-armed seated female deity belonging to *circa* eighteenth century are noteworthy.

8. Metal Sculptures, Calcutta

S.B. Ota and A.K. Bandyopadhyaya of the Calcutta Circle of the Survey, examined six metal objects which were seized by the Air Intelligence Unit of the Customs Authority of Calcutta Airport.

9. Stone Images, District Darjeeling

S.B. Ota and S. Maiti of the Calcutta Circle of the Survey, examined twenty-three stone sculptures seized by the Assistant Commissioner of Customs, Siliguri Division, which are kept in the Museum of North-Bengal University. These sculptures represent Vishnu, Sarasvati, Chamunda, Manasa, Venugopala, Buddha, Mahishamardini Durga, Bhairava, rider on elephant, male figure, carved stone piece, etc., all datable to *circa* tenth-twelfth century.

PLATES 150-151



150



151

Kalyanpur : coins of Muhammad Shah, 150 *(obverse) and* 151 *(reverse)*

PLATES 152-153



152



153

Parikshitgarh : coins of Alamgir II, 152 *(obverse) and* 153 *(reverse)*

PLATE 154



Calcutta : stone image of Surya

PLATES 155-156



155



156

Calcutta : 155, *female bust in metal and* 156, *metal bell*

10. Stone Images of Uma-Mahesa and Vishnu, District Darjeeling

A.K. Bandyopadhyaya and S. Maiti of the Calcutta Circle of the Survey, examined two stone images of Uma-Mahesa and Vishnu belonging to *circa* tenth-twelfth century, kept in the custody of Assistant Commissioner of Customs, Naxalbari Division, Siliguri.

11. Metal Lamp, District North 24-Parganas

A brass lamp datable to *circa* eighteenth-nineteenth century kept under the custody of the Basirhat customs Preventive Unit, Basirhat, was inspected by Santanu Maiti of the Calcutta Circle of the Survey.

12. Miscellaneous Antiquities, District South 24-Parganas

S.B. Ota and A.K. Bandyopadhyaya of the Calcutta Circle of the Survey, examined eight objects seized by the Kulpi Police Station authority. These include table clocks, porcelain vases, etc.

13. Metal and Stone Images, District Uttar Dinajpur

S.B. Ota and S. Maiti of the Calcutta Circle of the Survey, examined one metal and two stone images of Vishnu and one stone image of Manasa which are housed in the Office of the Superintendent of Customs, Buniadpur Preventive Unit, Buniadpur. The metal image of Vishnu dates back to *circa* eighth century while the stone images belong to *circa* eleventh-twelfth century.

IV. OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. Inscriptions, Districts Anantapur, Cuddapah, Kurnool, Nalgonda, Nellore, Prakasam, Warangal and West Godavari

The Directorate of Archaeology and Museums, Government of Andhra Pradesh, Hyderabad, reported the discovery of inscriptions from different parts of the districts which belong to the Kalyani Chalukyas, Chalukya-Cholas, Kakatiyas and so on. The Survey also brought to light habitation site, megalithic burials, temples and sculptures ranging from the early historic to the medieval times.

2. Votive Stupa Near The Mahastupa, Amaravati, District Guntur

The Hyderabad Circle of the Survey, discovered on the north-west comer of the Mahastupa at Amaravati, a votive stupa at a depth of 0.85 m while digging the foundation trench for constructing a low dwarf wall for providing barbed wire fencing. This votive stupa, circular on plan with a diameter of 2.75 m has three courses of bricks and is plastered with lime-mortar. Around it is a squarish stone paved flooring made of schist (Cuddapah) stone slabs of assorted sizes and shapes and is enclosed by a brick wall which is veneered with stone slabs on its inner face. The brick wall has been disturbed.

3. Relic Casket From The Buddhist Stupa at Kotturu, District Visakhapatnam

While executing the fencing work around the protected monument, a stone relic casket was found by the Hyderabad Circle of the Survey, on the eastern side of the stupa at its site. The relic casket, consisting of a Khondalite stone receptacle, is roughly rectangular in shape and measures 47 x 42 x 15.5 cm in which a casket made of marble and a small cylindrical rock crystal measuring 12.1 cm in dia and 6.5 cm in height were placed. Along the edges of this stone casket lid is an early Brahmi inscription which reads *'thambaya danam'*. On palaeographical grounds it is datable to the second century BC. Around the marble casket as well as the crystal phial, twenty silver flowers, two gold flowers and two gold foils with wheel-like design were noticed as offerings. Apart from this, one hundred and seven beads of semiprecious stones such as lapis lazuli, crystal, garnet, green beryl and carnelian, beads made of coral, pearl and copper were also found.

GUJARAT

4. Jaina Sculptures, Ghogha, District Bhavnagar

The Department of Archaeology and Museums, Government of Gujarat, reported the discovery of nine sculptures comprising a four-armed human form; female figure; sculptures seated in *padmasana* datable to *circa* thirteenth-fourteenth century.

5. Fragmentary Pottery, Vallabhipur, District Bhavnagar

D. R. Gehlot of the Vadodara Circle of the Survey, reported the discovery of red ware depicting a bust probably of a Western Kshatrapa King from Vallabhipur (pl. 157) during his inspection of the site. Bust is depicted within a dotted circle in low relief, datable to *circa* third century.

6. Harappan Seal, Dholavira, District Kachchh

Ramesh Kumar Singh of the Vododara Circle of the Survey, reported the discovery of a steatite seal (47 x 79 x 4 m) from Dholavira.

7. Harappan Site, Rapar, District Kachchh

Y.S. Rawat of the Excavation Branch V, Vadodara, of the Survey, under the supervision of R.S. Fonia, discovered a Harappan site at Rapar. The ancient settlement which lies buried under the present town has yielded a few potsherds and bone pieces. A few rubble walls have also been noticed in the deep foundation trenches dug up for construction of modern building.

8. Step-well, Temple and Sculptures, District Mahesana

The Department of Archaeology and Museums, Government of Gujarat, reported the discovery of Shitalamata step-well and a temple from Mandropur and Dasaj (Solanki period) and sculptures of Ganesa, Apsara and Mahishasura from Karali and Dasaj in District Mahesana, datable to *circa* ninth-eleventh century AD.

KERALA

9. Rock-cut Cave, Nagamalayarkavu, Badagara, District Kannur

T. Satyamurthy and Krishna of the Thrissur Circle of the Survey, discovered a rock-cut burial with all funerary assemblages.

10. Granary, Cherpunkal, Ettumanur, District Kottayam

The Thrissur Circle of the Survey, during the year under review, reported the discovery of an ancient granary at Cherpunkal, datable to eighteenth century AD. This granary consists of wooden walls and laterite slabs.

11. Temple Remains, Palazhi-Pala, District Kozhikode

The remains of sixteenth century temple were traced at Palazhi-Pala by the Thrissur Circle of the Survey. The temple is dedicated to Balasubrahmanyam.

MAHARASHTRA

12. Microliths, Ellora, District Airangabad

M.R. Dhekane, D.N. Sinha and H.S. Naik of the Aurangabad Circle of the Survey, during the course

PLATE 157



Vallabhipur : red ware sherd with a bust of Western Kshatrapa king

of their exploration, discovered blades, scrapers, cores and microliths of chert, agate and chalcedony. A *linga-pitha* and some potsherds of late medieval period were also noticed.

10. Ambarkhana, Panhala Fort, District Kolhapur

H.S. Naik of the Aurangabad Circle of the Survey, during the course of exploration, noticed some structural remains of medieval period near the area adjacent to Ambarkhana, which has a separate enclosure with the main entrance from the north and a small passage from the east.

Besides this, a hero-stone of late medieval period could be seen near the north rampart and some broken architectural members were also found in the south-west part of the Ambarkhana.

TAMIL NADU

11. Mesolithic Site, District Thanjavur

V.D. Misra of the Department of Ancient History, Culture and Archaeology, University of Allahabad, located a mesolithic site within the University campus near guest house. Tool types included blades, points, borers and scrapers. Other artifacts include modified cores, flakes, core, rejuvenating flakes and small chips. The raw material is predominantly quartz although cores of chert were also found, some of these show patination.

12. Plaque, Perunganji, District Vellore

G. Thirumoorthy of the Chennai Circle of the Survey, discovered a rare plaque (30 x 30 cm) in an ancient Siva Temple of the village. The stone plaque contains a row of six figures including Ganesa and Jyesthadevi flanked by attendants, seated on a lotus pedestal, besides other human figures standing in *anjali* pose. Stylistically, the plaque could be assignable to *circa* sixth century AD.

UTTAR PRADESH

13. Miniature Votive Shrines, Bamori, District Nainital

G.N. Srivastava of the Agra Circle of the Survey, noticed seven miniature votive shrines at the foothill of Mohalgad, in the revenue mauza of Bamori. The miniature shrines imitate the style of *rekha* temple and are monolithic. Except for the *kalasa* the crowning member which might have been fashioned out of separate piece, was kept at the top concave surface of the *sikhara.*

Some of the shrines are found carved with the crude figures of human couple which suggest these shrines to be *sati* memorials or hero-shrines.

14. Remains of Temple, Peora, District Nainital

G.N. Srivastava of the Agra Circle of the Survey, noticed a number of detached architectural stones *viz.,* door-jambs carved with floral designs and *purna-ghata* motifs, *chaitya-gavakshas, amalaka-stone, lingas* and other moulded stone kept at the site of Kumanesvara Temple. The finds of these architectural stones suggest that there were several minor subsidiary shrines as well as atleast one larger temple. As per the stylistic consideration the *chaitya-gavaksha* which might have been a part of larger temple could be datable to *circa* eighth-ninth century AD.

15 Ancient Site, Katingra, District Etah

G.N. Srivastava, assisted by S.K. Kulshrestha of the Agra Circle of the Survey, noticed an ancient site consisting of two mounds on the banks of river Kali at village Katingra. The smaller mound called Roriha Khera, is full of brickbats and has suffered in the hands of treasure-hunters. The larger mound is called Uncha-khera, located close by following the crescent curve of the river. The cultural assemblage of this mound consists of fine grey ware, coarse grey ware, black-slipped ware and NBPW. Besides, a few carved bricks have also been noticed lying at surface which are suggestive of the Gupta period.

V. RADIOCARBON DATES

The following radiocarbon measurements were made on archaeological samples during the period. All the dates are from Kunal based on 5730 ±40 years half life value of radiocarbon. Three C-14 samples were sent to the University of Pennsylvania, Philadelphia, USA, the details of which are as under.

HARYANA

KUNAL, DISTRICT HISSAR

IB BETA-77726

Date 5568 BP: 4040b70BP,

Calibrated date (Calib-3)

Local BC 2837 (25 68, 25 19, 25 05, 2466)

Depth: 149 cm

Trench: YCI, Qd IV, Layer: 4

IA BETA-77727

Date 5568, BC : 4250 B130 BP,

Date 5730 BC : 2430b 135 BC,

Calibrated date (Calib-3) Local BC

3016 (2884) 2621 Depth :300 cm,

Trench: YA2, Qd II, Layer: 10

IB BETA-77728,
Date 5568 BP : 3990b70 BP,
Date 5730 BC : 2160b70 BC, 0
Calibrated date (Calib-3) Local
BC 2577 (2473) 2409 Depth:
243 cm, Trench: XA3 Qd I,
Layer: 12

VI. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS[1]

The report incorporates the result of botanical study carried out at Birbal Sahni Institute of Palaeobotany, Lucknow, on the botanical remains from Kunal in Ratia tehsil, District Hissar in Haryana. The excavations carried out here are remarkable in many ways to have thrown valuable light on a cultural milieu that preceded Mature Stage of Harappan Civilization and gave rise to that later. The mound is located on the left bank of now dried-up course of the legendary River Sarasvati, much eulogised in Vedic texts. The mound covers a small area of about 1.20 hectares. The cultural deposit of a little over 3.00 m has revealed occupational strata divisible into three sub-periods, namely, la, Ib and Ic, from about 3,000 to 2,500 BC.

The cumbersome samples of carbonised botanical material were systematically collected from a wide range of deposits by the application of large scale floatation, during the excavations carried out by the Department of Haryana State Archaeology, in 1994 and 1995. The majority of plant remains turn to be the mixture of highly carbonised and mutilated grains, seeds and fruits of cultivated and wild plants, in a bulk of small wood charcoal pieces. The botanical study of these remains opens up avenues to conceptualise the growth and concomitant development in the state of agriculture and subsistence economy during first half of the 3rd millennium BC, and also furnishes the information on the economical and ecological background of ancient settlers at Kunal. For the samples collected from the site, the contributor gratefully acknowledges the Director, Haryana State Archaeology and Museums, Chandigarh, along with the excavators J.S. Khatri and Madhav Acharya for their generous help.

HARYANA

KUNAL (29° 30' N; 75° 41 E), DISTRICT HISSAR

The carbonised material from the earliest occupational phase (sub-Period la: *circa* 3,000-2,850 BC) was very limited in quantity and survived the preservation in poor state. In view of the presence of hulled barley *(Horedeum vulgare)* and lentil *(Lens culinaris),* it seems reasonable to believe that people who came to settle here, whoever they might have been, have had sufficient experience of agriculture and hailed from some farming community established elsewhere. The settlers opted for 'pit-dwelling'

'Contributed by K.S. Saraswat, Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow 226007

tradition. Post-holes have been noticed along the edges of shallow semi-subterranean pits, indicating that some kind of wattle-and-daub superstructures was raised above the ground to make them habitable. Small pieces of carbonised bamboo *(Bambusa sp)* and microscopic remains of *munj-gcass (Saccharum bengalese-Syn. S. munja)* leaf in a few pieces of mud-clods, provide direct evidence that bamboo and *munj-grass* were used in making wattle-and-daub structures, in the form of small circular huts.

In the subsequent sub-Period Ib dated from 2,850-2,600 BC, expansion of settlement and elaboration of semi-subterranean dwelling pits has been witnessed. The pits were now lined up with finely moulded mud-bricks. With the advancement in the material economy as a whole, rich and varied agricultural economy is evident by the cultivation of hulled barley *{Hordeum vulgare),* emmer-wheat *(Triticum dicoccum),* bread-wheat *(triticum aestivum),* dwarf-wheat *(triticum sphaerococcum),* rice *(Oryza sativa),* lentil *(Lens culinaris),* field-pea *(Pisum arvense)* and oleiferous linseed or alsi *(Linumusitatissimum).* It may be of considerable importance for archaeologists that the settlers of early Harappan community at Kunal, who were primarily the growers of wheat and barley in their traditional agriculture, included the rice in their economy at such an early date. Husk impressions in the pottery clearly indicate that the rice was of fully cultivated form and underwent its cultivation for a long period. Ganga Valley has at one time or other been considered as a part of hearths of rice domestication and cultivation, but the picture of rice-based agriculture on factual grounds in its homestead in not known before 2,200 BC at Neolithic Senuwar in Kaimur region of Bihar and Koldihwa in the Vindhyan plateau region of Allahabad in Uttar Pradesh. The dissemination of rice cultivation from its primary homestead somewhere in Ganga valley to the northwestern regions of Haryana and Punjab, would certainly have been a slow moving process through combined forces of natural and human selection, diverse climates, soils and varied cultural practices of different ethnic groups, which have had played enormous role in creating considerable ecological diversity in this crop, during early half of third millennium BC. The evidence of cultivated rice during 2,850-2,600 BC at Kunal is indeed to be reckoned with.

Associated weeds and wild taxa included the seed and fruit remains of *Capparis aphylla, Vicia sativa, Rumex dentatus, Cordia rothii or dichotoma, Ziziphus nummularia* and the species of *Phalaris, Datura, Aegilops, Melilotus, Cyperus* and *Indigo/era.* Several others could not be identified with certainty, due to mutilated state of preservation.

Real transition between Early Harappan and Mature Harappan cultures has been noticed in sub-Period Ic dated from 2,600 to 2,500 BC. Expansion in settlement, replacement of subterranean dwelling with wattle-and-daub structures by square-shaped or rectangular houses in a planned manner and Harappan technologies and other devices, in a similar way as represented by other major sites in the region, amply demonstrate a drastic spurt in the cultural advancement. Evidences show further advancement in the agricultural economy. In addition to the crops reported in the preceding sub-Period Ib, new finds in

this phase include the remains of naked-barley *(Hordeum vulgare var.nudum),* club-wheat *(Triticum compactum),* jowar-millet *(Sorghum bicolor), mung/green-gram (Vigna radiata),* grass-*pea/khesari (Lathyrus sativus),* horse-gram/kulthi *(Dolichos biflorus),* chick-pea/gram *(deer arietinum),* fenugreek/menthi *(Trigonellafoenum-graecum)* and til *(Sesamum indicum).* A cucurbit seed comparable to *Cucumis melo* has been found. Although its identification could not be determined with certainty, the seed in general appearance seems to be of musk-melon or *kharbuja,* grown for its fruits. Cultivation of cotton *(Gossypium arboreum/ herbaceum)* was also undertaken for making textiles, as evidenced by a carbonised seed of cotton and some textile impressions on pottery. Role of some fruits in the subsistence economy is apparent by the seeds and fruit pieces of wild-jujube *(Ziziphus nummularia),* date *(Phoenix* sp.), anwala *(Emblica officinalis), melon/phut* or *kharbuja (Cucumis melo)* and grape or raisin *(Vitis vinifera),* incidentally carbonised to survive the preservation.

Weeds and wild taxa represented by the seeds and fruits, include *Vicia sativa, Cenchrus cf.ciliaris, Lathyrus aphaca, Cleome viscosa, Coccinia cordifolia, Capparis aphylla, Salmalia malabarica, Albizia cf. lebbeck* and *species of Melilotus, Indigofera, Aerva, Cyperus, Medicago, Abutilon, Desmodium, Ephedra, Artemisia,* etc.

A large number of wood charcoal pieces studied from sub-Periods Ib and Ic (2,850-2,500 BC), throw light on the occurrence of local taxa in the region and their exploitation by the settlers at Kunal. A few quality timbers were made available from distant regions. *Jamun (Syzygium cumini),jhau (Tamarix dioica), palash (Butea monosperma), gular (Ficusglomerata), kaitha (Feronia limonia), babul (Acacia nilotica), neem (Azadirachta indica), sheesham (Dalbergia sissoo), bel (Aegle marmelos) and bamboo (Bambusa sp.)* were main trees exploited for fuel and other constructional purpose. Timbers of chir-pine *(Pinus roxburghii)* and deodar *(Cedrus deodara)* were obtained from far distant Himalayan forests. *Karangi* or *Kanderi (Caesalpinia crista or C. decapetala),* wild jujube *(Ziziphus nummularia/oenoplia),* heens *(Capparis sepiaria)* and *phog (Ephedra sp.)* were the common shrubs growing in the region of settlement. Mulberry *(Moms alba), sahjan (Moringa pterigosperma)* and a form of lemon *(Citrus sp. possibly Citrus limon)* were cultivated for their fruits. The present day eco-system in the region has been totally changed. During the period of ancient settlement at Kunal, Sarasvati flowed in all its true splendour as a great river. *Jamun* trees, which are cultivated in gardens now-a-days, would have occurred in the wild, along the river course. Its fruits, in all likelihood, were eaten by ancient settlers. A few pieces of *bhang (Cannabis sativa)* stem charcoal have also been identified. *Bhang* is well known for its narcotic effect. The ancient settlers perhaps could not afford to neglect the traditional use *of bhang* as a recreational stimulant.

In view of the above evidences a generalised picture can be envisaged about the surrounding forests. Most of the locally occurring trees and shrub taxa are deciduous elements. There would have certainly remained considerable moisture content in

the atmosphere, but at places were also found scrubby patches in the jungles where xeric elements, such as *kareel (Capparis aphylla), jharberi (Ziziphus nummularia),* phog *(Ephedra sp.), karangi (Caesalpinia crista)* and *gorakh-boonti (Aerva sp.),* etc., were of common occurrence. An overall evidence suggests the prevalence of semi-arid type of climate in the region of ancient Kunal.

VII. MUSEUMS

1. Government Museum, Agartala

The museum acquired a bronze Buddha image through donation from Nalchar, Melaghar, Tripura, datable to *circa* ninth-tenth century. Lord Buddha seated in *padmasana* on a lotus pedestal in *bhumisparsa mudra* and two figurines of lion appear on two elephants, in front of the pedestal.

2. Allahabad Museum, Allahabad

The Museum acquired through purchase seventy-one antiquities, art objects and documents to enrich its collection. These include thirteen sketches on postcards and one painting by Nandalal Bose; one Mughal painting depicting a king seated on throne; set of three silver Indo-Greek coins belonging to Menander, Apollodotus and Seles; one silver coin of Mohammad Ali Shah of Oudh; one painting depicting Krishna as a child; one Tanjore-style painting of late eighteenth century; one stone head of Vishnu, adorned with *Kirita-mukuta;* one miniature painting showing Narasimha incarnation along with depiction *of Dasavatara* of Vishnu, twenty-seven fragmentary terracotta objects belonging to Sunga and Kushan periods and twenty-one animal-shaped beads made of semiprecious stones.

The Museum also collected a large number of stone sculptures along with potsherds ranging in date from Kushan period to the medieval period from various places of Allahabad in the course of surface exploration.

The Museum also organised an exhibition entitled 'Masterpieces of Indian Art' mainly comprising stone sculptures, bronzes, terracottas and architectural remains. Another exhibition, organised by the Museum, in collaboration with the Eastern Roerich Society 'Urusvati', Russia, was to highlight the coloured reproductions of the paintings of Nicholas and Svetoslav Roerich. The third exhibition was based on select paintings of the various competitions organised in the Museum.

During the period under review, the Allahabad Museum organised two national-level seminars, besides many smaller colloquiums. A national seminar on 'Historiography of Indian Art and Culture with special reference to fifty years of India's Independence' was organised on August 16-18, 1997. A seminar was also organised on 'The Role of Museums in promoting Cultural Education, Creativity and Nation-building' from 19 to 21 December, 1997. The Museum celebrated the

closing centenary of Pandit K.C. Chattopadhyaya on 26 October, 1997 and observed 'Foundation Day' on 1'4 December 1997. Colloquiums were organised to mark the completion of second centenary year of Mirza Ghalib on 27 March, 1998 and on 30 January, 1998 to mark the death anniversary of Mahatma Gandhi. A seminar on 'Maan and Mulya' was organised on February 21 - 22,1998, under the Project 'Literary and Cultural History of Allahabad'. Fourteen lectures were organised by the Museum which were delivered by eminent and literary personalities like Tosheo Tanaka from Japan, M.S. Jain, Govinda Chandra Pande, Namvar Singh, Shrilal Shukla, Kamleshwar, Nemi Chandra Jain and Lakshmi Kant Verma. Four workshops were also held during the period under review. It included two clay modelling and two painting workshops.

On the occasion of fifty years of India's Independence, the Allahabad Museum has commenced a six-month (subsequently made one-year) Diploma Course in the 'History of Indian Art, Culture and Tourism'. The course commenced on 18 February, 1998, which was inaugurated by B.N.S. Yadava, a noted Historian. The course has been specially designed to meet the requirements of students and it is the first of its kind in India to make them aware of a career in the field of cultural service.

3. Indian Museum. Calcutta

The Archaeological section of the Indian Museum was enriched by acquiring stone image of standing Surya, seated Manasa and Sadasiva of tenth-eleventh century besides a metal image of Mahishasuramardini. The galleries were re-arranged, improved and thirty-eight sculptures representing animal and plant motifs were displayed. An open air gallery to display a number of sculptures and architectural fragments was opened. Further progress was made by renovation and reorganisation of godowns and alleys of the prehistory gallery which included illumination and installation of study-cum-visual storage facilities by the introduction of heavy duty storage system.

4. Government Museum, Egmore, Chennai

During the period under review, the museum acquired the following objects as treasure trove *viz.,* one crawling Krishna of fifteenth century AD, one Balasubrahmanya (ht 59 cm) of about fourteenth century AD, from Devakandanallur, Kudavasal taluk, District Tiruvarur, One Vishnu (ht 85 cm) of about fourteenth century AD from Tarangambadi, District Nagapattinam, one Chandrasekhara (ht 44 cm) of about tenth century AD from Pillaiperumalnallur, Tarangambadi taluk, District Nagapattinam. One Ardhanarisvara, Parvati, Sakti-Ganapati and one five nicked lamp from District Kanchipuram of very late period (ninteenth century AD).

5. Archaeological Museum, Mattancherry Palace, Cochin

The museum attended to the work of applying distemper to the Coronation Hall; repairing of bore-well system for water facilities to the tourists; providing teak wood shutters to control direct sunlight to the painting, etc. It also brought out a brochure in English for free distribution to tourists.

In Gallery 4, brass domes were polished. Besides four glass show cases have been made to exhibit the coins.

6. Maharajadhiraja Lakshmishvara Singha Museum, Darbhanga

On the occasion of the "Heritage Preservation Week" the museum organised a painting exhibition. A painting competition among the school students was also held in addition to debate, essay writing, fancy dress and music for which the successful participants were awarded.

7. Government Museum, Guwahati

During the year under review, the Directorate of Museums, Government of Assam, Guwahati, acquired a number of manuscripts from District Golaghat; in addition to two stone pillars from Kamakhya hills, Guwahati and a stone inscription namely "Nagajari-Khanikargaon", Part II, assignable to the sixth century AD, collected from Borpathar, District Golaghat.

The Directorate also celebrated the fifty-eighth Foundation Day of the Assam State Museum on 21 April, 1997. As a part of this, a lecture on the "Cult of Gopala Krishna" was delivered by M.L. Nigam, former Director of Salarjung Museum, Hyderabad.

The fifty years of India's Independence was celebrated in collaboration with the Indian Art History Congress on 9 November, 1997. As a part of this, two days Commemorative lectures were arranged on 9 and 10 November, 1997. On the first day, the "Karl Khandelawal Memorial Lecture" was delivered by N.P. Joshi on "Some observation on *Dasavatara* Images of Vishnu" while the second one "Dr. R.N. Mehta Memorial Lecture" delivered by B.N. Mukherjee was on "Early Kamarupa School of Sculpture". On the second day M.L. Nigam delivered the K.K. Dasgupta Memorial Lecture on the "Mughal Jades of India".

8. Salar Jung Museum, Hyderabad

The Museum celebrated fifty years of India's Independence. A mobile exhibition entitled "Highlights of Freedom Movement and Emergence of Salar Jung Museum" held on 17 August, 1997, exhibiting the rare photo illustrations as also by bringing out a coloured brochure in four languages (English/Hindi/Telugu/Urdu). The brochure highlights the historical events related to the freedom movement and role played by distinguished National leaders and personalities.

A special Exhibition entitled "Birds and Animals in the Art collection of Salar Jung Museum" was also arranged on 17 August, 1997. Exhibition included rare objects showing birds and animals depicted on pottery, metal, wood and ivory and paintings. Another special exhibition on "Select art objects from the reserve collection" was organised on the eve of one hundred and twelfth inaugural day celebration of the museum on 12 February, 1998. The exhibits included a wide variety of art objects such as oil paintings, metal ware, wood carvings, miniature paintings, etc. The Museum also organised a photo exhibition on the life of Salar Jung at Raja Dinkar Kelkar Museum, Pune-the birth place of Nawab Salar Jung III on 15 February, 1998, for a period of one week.

Two national level seminars on "Aspects of Protection, Preservation, Care and Display of Art objects in Museums of National Importance" and "Select Art Treasures and Illustrated Manuscripts in the Salar Jung Museum" were organised. Some gallery talks pertaining to the Museum galleries were also arranged in the Museum.

On the eve of Museum Week, four special lectures were arranged on the following topics: centre of learning; art and communication; museum and community; coinage of early Andhra.

On the occasion of birthday celebration of Salar Jung three memorial lectures were arranged on 15 February, 1998.

Children's Week was celebrated from 14 to 20 November, 1997 and children upto the age of twelve years were allowed free entry into the Museum. In all three thousand nine hundred and thirty-one childerns with one hundred and ninety-three teachers from eighty seven educational institutions visited the Museum. Essay writing and elocution competitions in four languages (i.e. Hindi, English, Telugu and Urdu) among school students upto IX class, were conducted.

Museum Formation Day was celebrated on 16 December, 1997, by arranging a National Seminar on "Select Art Treasures and Illustrated Manuscripts in the Salar Jung Museum".

During the period, the manuscripts were physically verified, fumigated and preserved. The Museum also treated twelve hundred eighty-eight objects including paintings and manuscripts in its chemical conservation laboratory. One thousand two hundred and eighty-eight objects of different categories including fifty one miniature paintings were chemically treated in the laboratory. Besides this section has also attended to the treatment of manuscripts and books which include deacidification, lamination, repair and binding.

9. State Museum, Lucknow

During the year under review, the Museum acquired one seal (6 x 4.5 cm)depicting a lion on the upper portion besides three metal objects comprising copper harpoon (21.5 x 4.5 cm) and axes (18 x 13 and 17.3 x 7 cm). The Museum also enriched its collection by acquiring twenty-two coins. Of these, seven are lead coins of Satavahana dynasty; two in silver of Sassanian type; six copper coins of Gadhaiya type; six copper coins of Malava Varma Deva and one of Nahapana in silver. In addition to these, the museum has also acquired three objects for its Decorative Section which comprise one historical watch besides two brass *bakkals.*

The museum also acquired a Rajasthani pichhwayee of late nineteenth century (121.92 x 93.52 cm) with floral borders depicting some Rajput Royals enjoying music and dance inside the fort besides a palace, surrounded by a lake in the bottom.

10. Government Museum, Mathura

During the year under review, seven hundred and six objects have been acquired which comprise twenty-three stone sculptures; six hundred and sixty-two coins of copper; eight coins of lead; five miniature paintings and eight terracottas.

Among the noteworthy antiquities, mention may be made of an inscribed pillar base (dia 173 cm) carved with two lines of Brahmi inscription mentioning the year and the name of reigning Kushan King Huvishka (AD 111). The inscription reads as under:

Maharajas Devaputrasya Huvishkasya Sam 30+3 = 33 he ekadivasa do etasya purvaya Buddha rakshita dhamma rakshitan bhratana somaputrana brahman an upavaya sagotranam takhisilakanam danam kubhakam svake vihare toiyam Samghachaturdishe acharyanaim sarvastivadina parigrahe. Atmanasya aroga dakshinaya mata-pitranam pujartha sarvasyava parovarasya dirgha ayukataya Sarvasatuanain hita sukhartha.

The inscription was collected from Raman Lai Sorawala Public School, Maholi Road, Mathura.

11. Hazarduari Palace Museum, Murshidabad

Steel racks and almirahs have been provided in the record room with electrical outfit for preservation of old records, *farmans,* deeds and various other documents. The Toshakhana which preserves the most valuable silver and gold objects has been provided with proper security arrangements and electrical fittings. Wooden showcases have been prepared for display of minor objects in the western drawing room. To promote the sale of Departmental publications the showcases have been specially prepared and fitted with glass coverings. Steel cabinet and almirahs have been provided to augment proper left luggage facility to the visitors. Labels and charts have been prepared for the Nawab, Diwan, Prince and Landscape galleries. Proper arrangements have been made for the lamination and binding of the old manuscripts and books.

12. Archaeological Museum, Old Goa

Two new wooden pedestals were prepared to display wooden statues of Bishops. The entire interior wall of the ground floor was given a coat of OBD painting. The old damaged iron grill-gate of the rear entrance of the Museum was replaced with a new one for security measures. The shutters to windows on the upper storey were replaced with louvre-type windows. Eight exhaust fans were fitted at required points so as to keep the Reserve collection humidity-free. For adequate air circulation in the galleries, fifteen air circulators were acquired. Six more benches have been prepared in teakwood and kept in the lobby and the galleries for the visitors. The names of Governors and Viceroys of Portugal in Goa have been printed in vinyl.

13. Archaeological Museum, Ratnagiri

During the year under review, iron grills were fixed on the skylight of Galleries 3 and 4. In Gallery 4, a false wall in wood, ply and sunmica was provided apart from laying venyl flooring. The interior of the Museum was painted and iron grill fencing was provided to the upper steps of both sides of the museum building.

14. Bharat Kala Bhavan, Varanasi

During the year under review, the Museum acquired through donation coins of copper and silver besides lead and potin coins.

VIII. ARCHITECTURAL SURVEY

TEMPLE SURVEY (NORTHERN REGION)

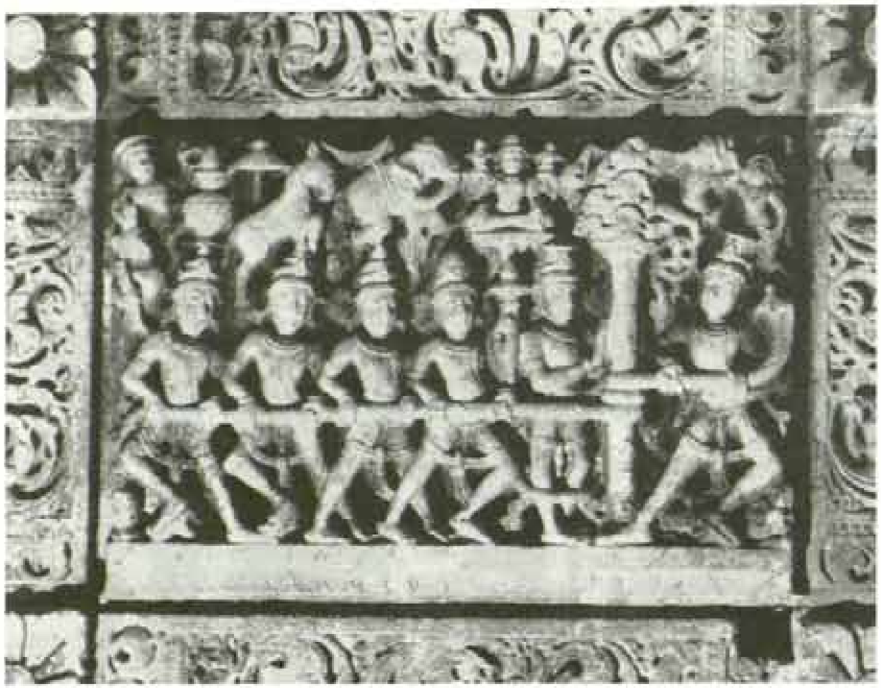
The Temple Survey Project (Northern Region) under P.K. Trivedi, assisted by Lakhan Kumar Bhagchandani and Alhad Vyas continued the architectural survey of the temples of southeastern Rajasthan. Vishnu Temple, Ekalingaji, District Udaipur, which faces the west, is locally known as Takshakesvara or Kundesvara Mahadeva Mandira being situated near a *kunda.* The beautiful but small *nirandhara* fane has preserved *pancharatha garbhagriha* and *antarala,* the portico and superstructure being the later addition. Raised on *kharasila* it shows a low *pitha, vedibandha* and *jangha* showing three cardinal *bhadra-nichzs* harbouring the figures of Brahma (N), Yoganarayana-Vishnu (E) and Siva (S) while projections *of antarala* bear *rathikas* of the same size containing figures of Lakshminarayana (N) and Uma-Mahesvara (S). *The jangha* provided with *jalantaras* is further decorated with *vyalas, apsarases* and two-armed *dikpalas* (pl. 158). The shrine, attributable to Guhilas, may be dated stylistically to third quarter *of circa* tenth century. The Vaishnava Sas-Bahu Temple group, Nagada, District Udaipur, is raised on a moulded jagati' and is entered through a high ornate *torana* of *hindolaka* type, erected near a large Baghela lake. The larger Sas Temple roofed by brick-work, is surrounded by ten subsidiary shrines. It consists of a *pancharatha garbhagriha, antarala, ranga-mandapa* provided with latticed screens and *mukha-mandapa.* The door-frame of the sanctum entered through *udumbara* is of *panchasakha* variety while *ranga-mandapa* is provided with a door-frame of *saptasakha* class. The ceiling of *ranga-mandapa* is divided into nine bays including the central *karotaka* composed of receding rings resting on four central pillars of *misraka* order carrying *makara toranas.* The other compartments of the ceiling are provided with *samatala* or *kshipta vitanas* of *nabhichchhanda* order resting on faceted pillars and pilasters surmounted by ribbed *bharanis* topped by kumara-brackets sharing the load of decorated architraves *(pattas).* The ceilings also reveal epic scenes *viz.,* churning of ocean, Bali and Sugriva combat (pls. 159-160), framed by *pattikas,* carved with stencilled vegetal dormer. The architraves of eastern, western, southern, northern and central bays bear small sunken niches, alternating

PLATE 158



Ekalingaji : Vishnu Temple

PLATES 159-160



159



160

Sas Temple, Nagada : 159, *Churning of Ocean and* 160, *Bali-and- Sugriva combat*

with projected ones and containing different deities and human figurines. The northeastern pillar of *ranga-mandapa* is carved with scenes of *Ramayana viz., agnipariksha* of Sita, Lakshmana lying unconscious, Hanuman bringing Himalaya mountain containing *sanjivani-buti,* etc. The pillars and pilasters of *ranga-mandapa* rest on *kumbhis* addorsed with a small niche on cardinal faces containing figurine of a deity or dancer, the shaft *(stambha)* harbours *apsarases* or deities in large *rathikas,* flanked by *triratha* Latina *sikharikas* placed on *vikarnas,* other traditional mouldings and decorative motifs, ribbed *bharani* and four-armed *kumara* brackets. The *mukha-mandapa* supported by a pair of dwarf pillars and pilasters shows a circular ceiling of *sabhamarga* order encircling a hanging *padmakesara.* The moulded doorsill *(udumbara)* of *ranga-mandapa* exhibits a slightly projected semicircular *mandaraka* bedecked with spiral lotus scrolls encircling *kinnaras,* flanking an emerging lotus-stalk in the middle. Whereas, the northern extremity depicts a four-armed seated Lakshmi, the southern extremity reveals a figurine of four-armed seated Nidhiputra. Above the *saptasakha* doorway of the *ranga-mandapa* is portrayed Vishnu, flanked by a female flywhisk-bearer. The upper architrave *(uttaranga)* shows nine planets in pedimented niches interspersed with male dancers. The *rajasenaka, vedika, asanapatta* and *kakshasana* are profusely carved with figurines of couple, birds, *dikpalas* and other deities whereas the *jangha,* divided into two registers by a horizontal band of *grasamukhas* is stark plain but for the seated images of Brahma, Siva and Vishnu surmounted respectively by Rama, Balarama and Parasurama. The smaller Bahu Temple is surrounded by four *karnaprasadas.* The temple proper *(mulaprasada)* consists of a *pancharatha garbhagriha, antarala, sabha-mandapa* with lateral transepts *(parsvalindas)* open on both the sides and *mukha-mandapa.* The edifice raised on *kharasila* shows a *pitha* overlain by *vedibandha* (pl. 161). *The jangha* divided into two registers is decorated with seated images of four-armed Siva (S) Vishnu (W) and three-headed Brahma as *bhadra-devatas* surmounted respectively by Parasurama, Balarama and Rama. The *pratirathas* and *karnas* are represented by faceted pilasters. The exterior *of mukha-mandapa* and *sabha-mandapa* is profusely carved with figurines of ascetics, erotic scenes, dance and music scenes, couple, royal persons, warriors, *apsarases,* different forms of Vishnu, Indra, Agni, Nirriti, Varuna, Vayu, Kubera, Isana etc. The doorway of the sanctum shows the innermost *patrasakha* carved with (1) convoluted lotus creepers encircling *hamsa-yugma,* bird, tortoise, monkey, musician etc. (2) *padma patrasakha* bedecked with stencilled lotus creepers and (3) the outermost *patrasakha.* Below are portrayed the river goddesses, *naga* figures in adoration and Vaishnava door-keepers. Another small shrine with intact stone *sikhara* on plan includes a *triratha* sanctum, *antarala, praggriva* and faces the south. The exterior of the sanctum is decorated with four-armed images of Vishnu (W), Siva (N) and Brahma (E) as *bhadra-devas.* The *mulamanjari* of the spire shows *parsvalatas* marked with seven compressed *bhumi-amalakas.*

PLATE 161



Nagada : Bahu Temple

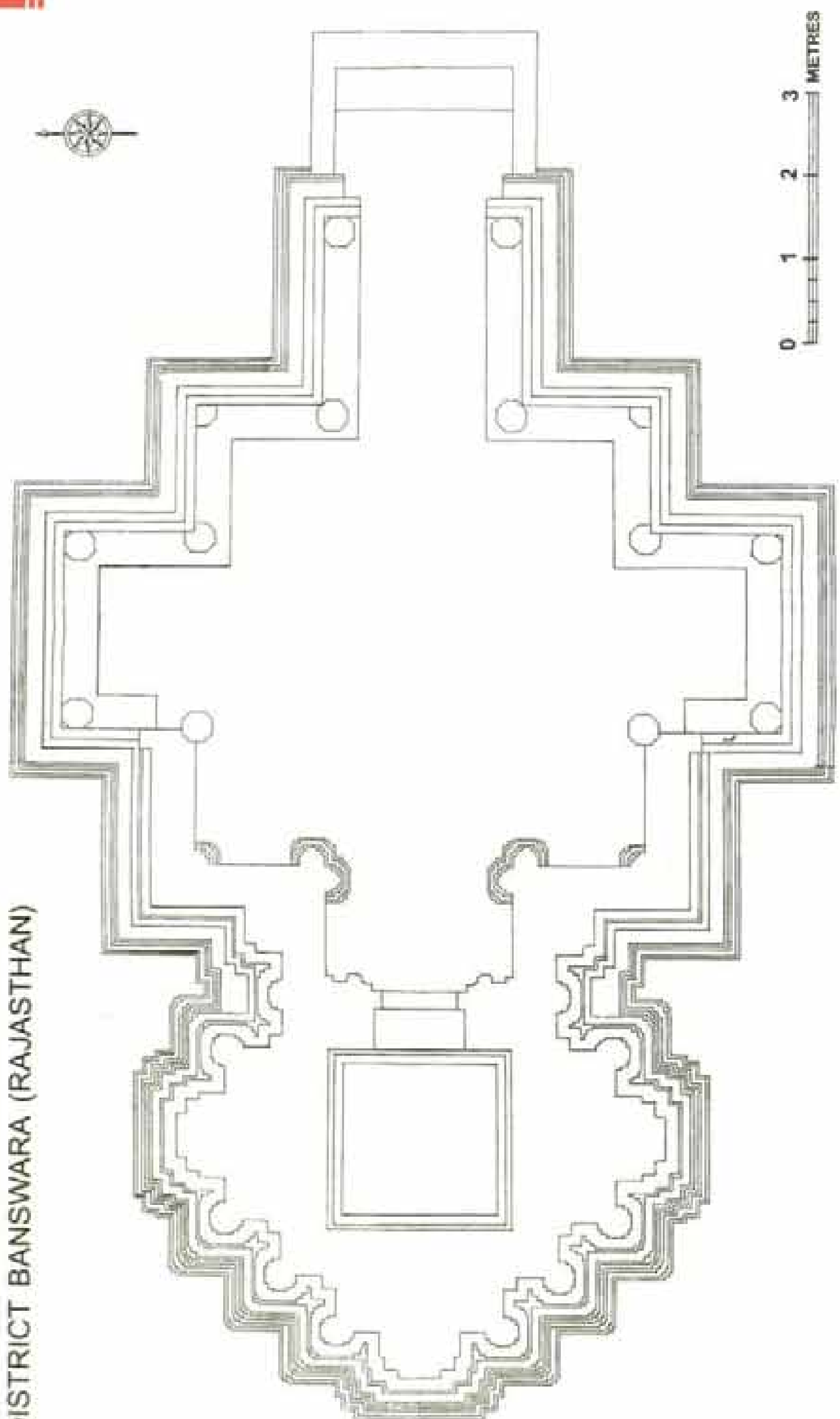
The *sikhara* is coped by a large *amalaka, kalasa* and *bijapuraka.* These temples may be assigned to the late tenth century.

Bhumij a temple, sacred to Siva at Panaheda in District Banswara (fig. 40), was built by King Mandanadeva of the Paramara branch of Vagada in AD 1059. Facing the east, the temple proper consists of *pancharatha garbhagriha, antarala, sabha-mandapa* and *ardha-mandapa* (pl. 162). The *jangha* composed of decorated pilasters is relieved with the pedimented cardinal niches containing ten-armed images of Andhakantaka-Siva (S), Natesa (W) and Chamunda (N).

Arthuna, the capital city of the Paramaras of Vagada in District Banswara is well-known for its temples and sculptural art. Mandalesvara Temple, Arthuna, was presumably a *saptayatana-comp\ex.* The *mulaprasada* consists of a *nirandhara panchanga garbhagriha* showing *bhadra, pratiratha karna* and *nandikas* between *pratirathas* and *bhadras, antarala, sabha-mandapa* with lateral transepts and *mukha-mandapa* (pl. 163). In the same axis exists a ruined *nandi-mandapa.* The *bhadra khattakas* harbour ten-armed images of Andhakantaka - Siva, Natesa and Chamunda. It is worth mentioning here that Chamunda holds a bowl carved with fish. The 'fish' motif is associated with tantricism and is also found in case of other Saivite images of Arthuna. The sanctum is provided with a ceiling of *nabhichchhanda* order and its doorway shows five *sakhas,* river goddesses and *Saiva-Pratiharis.* The ceiling of *sabha-mandapa,* composed of concentric rings, shows depiction of the scene of churning ocean on its *narapattika,* relieved with sixteen *vidyadhara-*brackets. The superstructure is of brick-work. As per the record affixed in *sabha-mandapa* the edifice was built in AD 1080 by King Chamundaraja in honour of his illustrious father Mandanadeva.

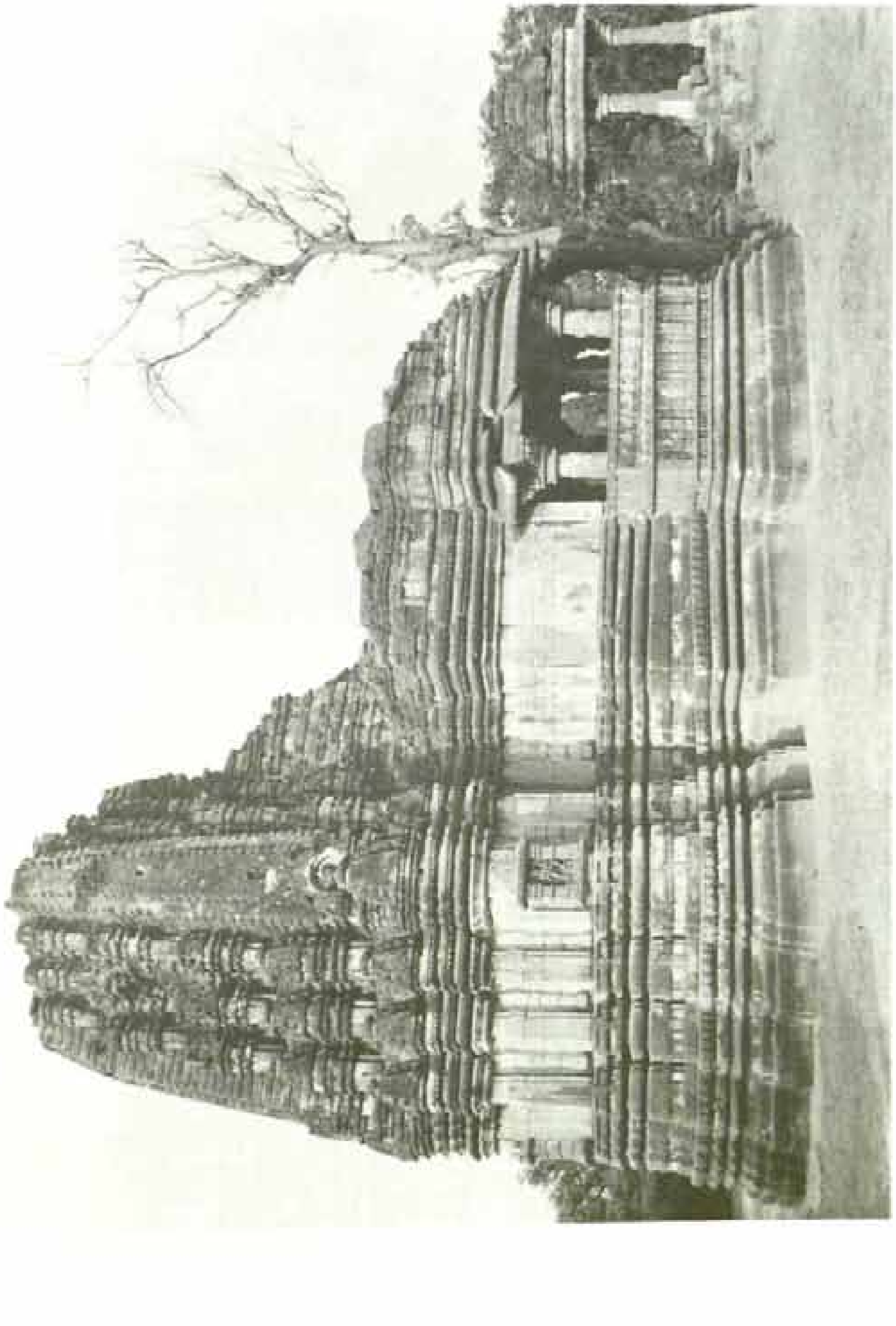
Siva Temple No. 3, Arthuna, is a west-facing large temple. Raised on a partly buried *high jagati,* the temple proper was presumably surrounded by subsidiary shrines. On plan it includes a *pancharatha* sanctum, vestibule assembly - hall and portico. The *jangha* is embellished with beautiful imagery including four-armed *dikpalas,* damsels and ten-armed Chamunda, Natesa and Andhakantaka-Siva as *bhadra-devas* in pedimented *rathikas.* The crowning members *of pancharatha mulamanjari* surrounded by *angasikharas* are missing. The *sabha-mandapa* and *mukha-mandapa* are roofed by *samvarna.* Hanuman Gadhi group of shrines originally enclosed by brick-wall is named after a colossal image of Hanuman dated VS 1165 (AD 1107) built during the time of Vijayaraja of the Paramara branch. The complex is entered through a double-storeyed pavilion *(valanaka)* of the southeastern side. Nilakantha Mahadeva temple is the loftiest edifice in this group. Facing the east, it consists of a *saptaratha garbhagriha,* constricted *antarala* and *sabha-mandapa* open on three sides. The *rathas* composed of pilasters exhibit *salilantaras.* The pedimented *bhadra-nichcs* of the sanctum except the southern one harbouring a seated Lakulisa figure are vacant, whereas a ten-armed

Fig. 40



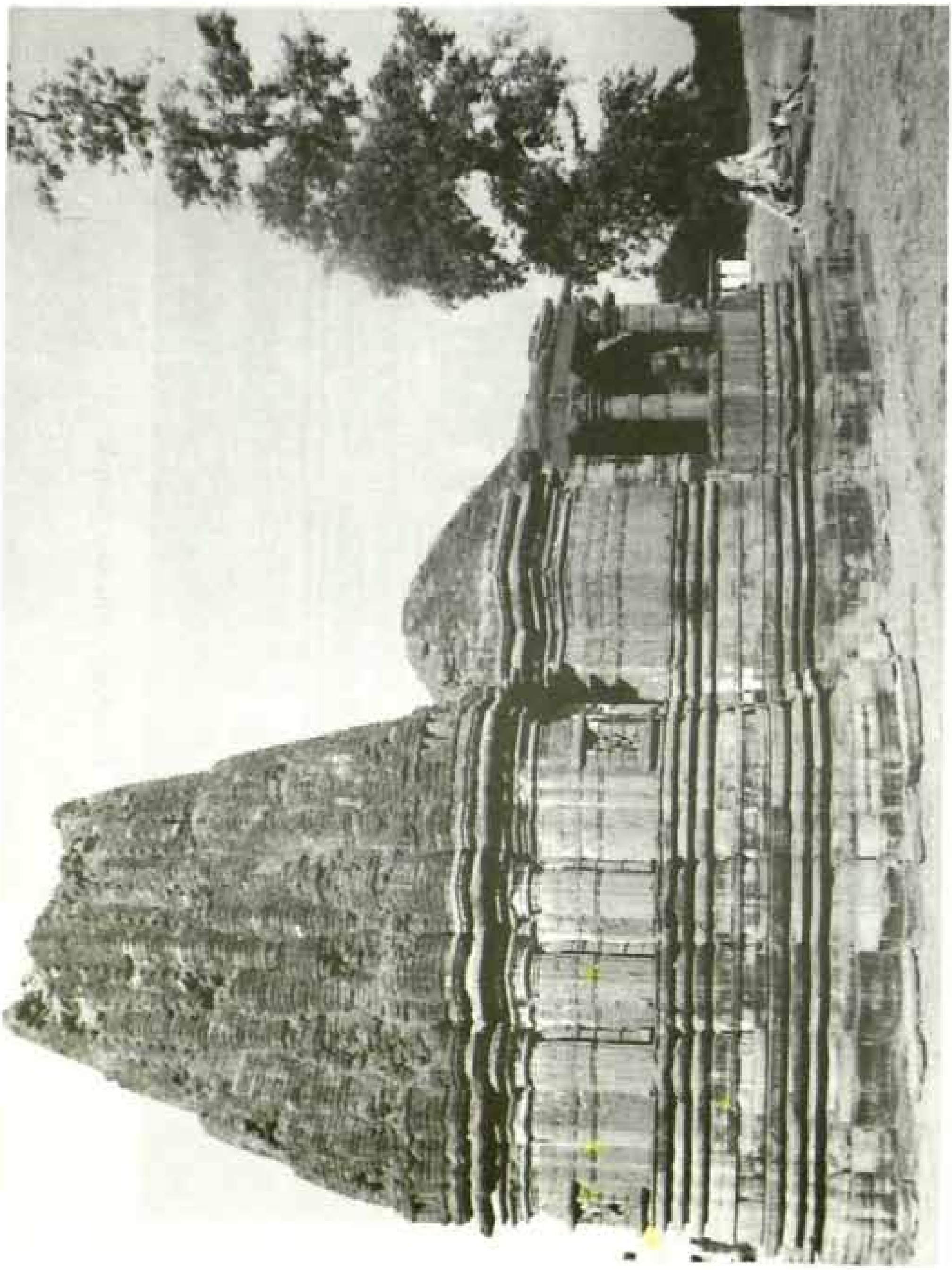
PANAHEDA : MANDALESVAR TEMPLE
DISTRICT BANSWARA (RAJASTHAN)

PLATE 162



Panaheda : Bhumija Temple

PLATE 163



Arthuna : Mandalesvara Temple

image of Nirriti is retained in a niche of *antarala* (N). The *pancharatha mulamanjari* surmounted by a fluted *amalaka,* decorated with a plain median strip, *chandrika, amalasarika* and *kalasa* is addorsed by three successive rows of *urahsringas* and is surrounded by *angasikharas.* Dhvaja Purusha with a stone ring above to insert flag staff has been provided to the southwestern portion of *mulamanjari.* Whereas only the lower portion of the *sukanasika* over vestibule is intact, the *sabha-mandapa* is roofed by *samvarna.* The construction may be assigned to the eleventh century. In this complex, Shrine Nos. 8 and 9 are the most beautiful, identical on plan and westerly oriented. Each consists of a *pancharatha garbhagriha, antarala* and *praggriva.* The superstructure over the sanctum of both the shrines is of *phamsana* variety. While the *jangha* of Shrine No. 8 is devoid of imagery, Shrine No 9 is studded with excellent images of four-armed *dikpalas, apsarases* and eight-armed figures of Chamunda (N), Natesa (E) and two-armed Lakulisa (S) as *bhadra devatas.* Stylistically, both the shrines may be dated to the last quarter of the tenth century (pl. 164). The east-facing Shrine No. 4 on plan consists of a *triratha* sanctum, constricted *antarala and praggriva.* It is raised on a *iowpitha* constituted by plain *bhitta jadyakumbha* carved with plain *chaitya-arches,* knife-edged *kani,* plain *antarapatra* and *kapotika.* The *vedibandha* is followed by *jangha,* plain *bharana, chhadya, varandika,* plain recess, *pattika* with hanging *gagarakas* over which rests pyramidal superstructure, composed of receding horizontal tiers *{bhumis)* bedecked with plain *chandrasalikas.* The square sanctum houses a moulded *pithika* carved on its top with three sacred animal figurines—*Hamsa, Vrishabha* and *Garuda.* A panel showing Brahma, Siva and Vishnu was installed here. *The pithika* bears a record dated VS 1154 (AD 1097).

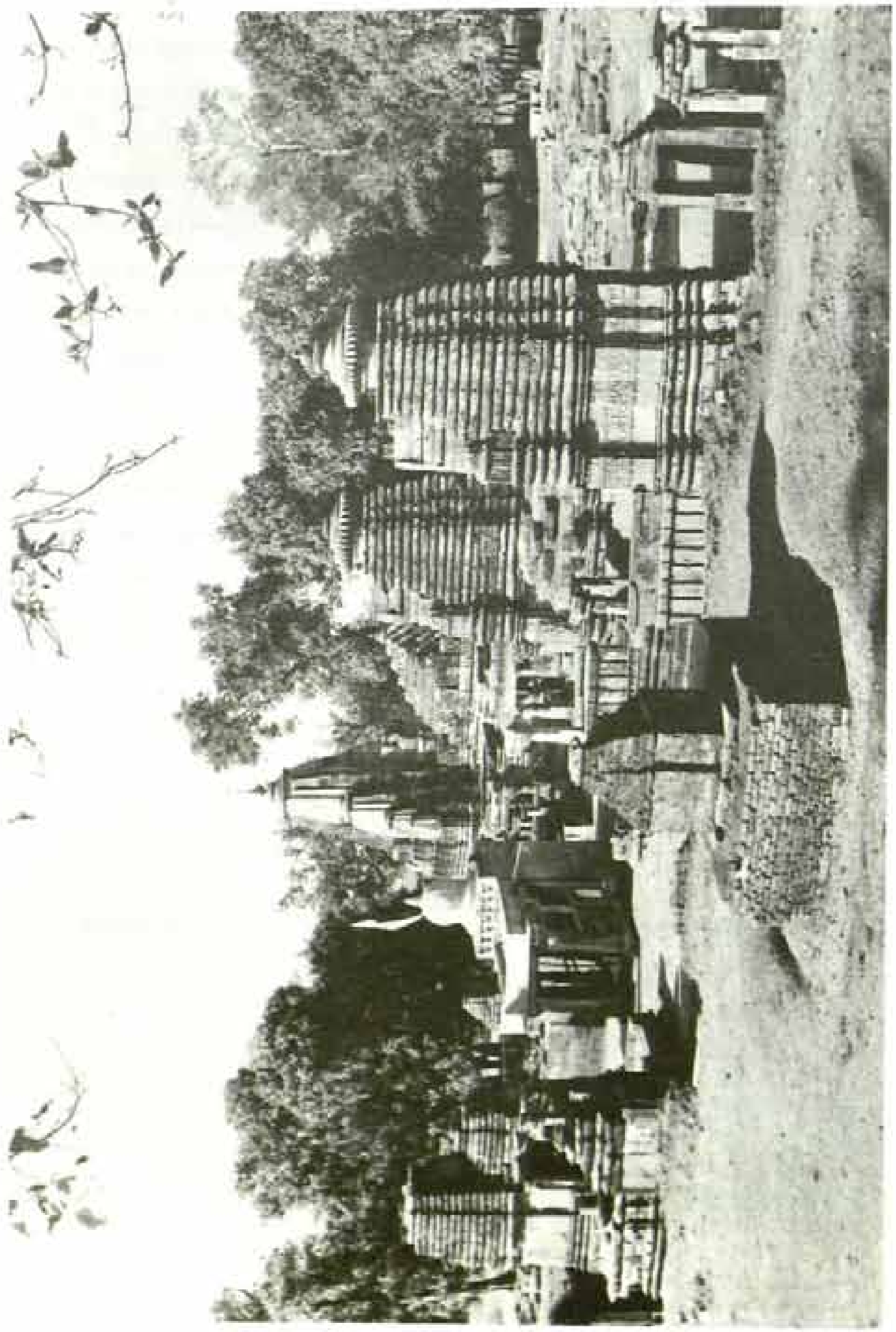
TEMPLE SURVEY (SOUTHERN REGION)

The Temple Survey Project, Southern Region, Madras, under the direction of Superintending Archaeologist, discovered a few temples in District Mysore, assignable to the Chola period, during the course of finalisation of the preliminary report on the survey of Chola temples in Karnataka. The temples are: Siva Temple at Kaliyuru; Siva Temple at Agara; Vishnu Temple at Maddur; Siva Temple at Chamarajanagar; Siva Temple at Edathore. '

Most of the above temples contain Tamil inscriptions assignable to the Chola period and after. The Siva temple at Kaliyuru, though does not contain a foundation inscription, it bears all the architectural traits common to the Chola temples found in District Mysore, such as *adhishthana* mouldings, pillar details, *prastara* motifs etc. In addition to these architectural features, the *Siva-linga* enshrined in the temple bears a striking similarity to that of the Chola Royal Temple at Tadimalingi. Detailed documentation of these temples has also been taken up.

In the course of field survey, some loose sculptures *viz.,* a standing Vishnu image and icons of

PLATE 164



Arthuna : Hanuman Gadhi group of Temples

matrikas from the *sapta-matrika* group, assignable to the Chola period, have been found at Agara in Yalandur taluk of District Mysore; three *Siva-lingas* and *nandi* images have been collected from a coconut grove at Kudlur on the way to Hale Alure in Chamarajanagar taluk; uninscribed hero-stones and saft'-stones assignable to the Chola period have been discovered at Nandigunda, Kaliyur, Chikkati and Kolagala; the Chola Royal Crest namely, the tiger carved on the northern wall of the central shrine of the Mahalingesvara Temple at Tadimalingj in prancing posture as depicted in the Chola coins of the Sangam period, has also been discovered. It appears that the Chola King Rajaraja I after getting this temple constructed, caused the carving of the Royal Crest probably to herald the Chola victory over the Kamataka land. Just above the tiger, an attempt has been made to carve a parasol, but it is left incomplete.

The Temple Survey (Southern Region) also conducted the survey of sepulchral temples at B.N. Jallihala, District Bijapur, Kamataka; Cholapuram, District Vellore and Brahmadesam also in the same district in Tamil Nadu.

An inscription from Cholapuram records that a Chief named Rajaditya built a temple of Siva at the burial site of his deceased father, Prithvi Gangarayar. This temple is completely ruined now.

At B.N. Jallihala, there is a cluster of about eleven temples of varying dimensions which appear like a mass cemetery. The main temple is dedicated to the memory of the Chalukyan King Vikramaditya-II (AD 733-44), as attested to by an inscription engraved in the temple.

The sepulchral temples of the Chola King Rajendra-I and that of his queen, Veeramadevi, who committed *sati* in the same tomb of her husband, have been discovered on the basis of circumstantial evidence at Brahmadesam. While the former is in a fairly good state of preservation, the latter which stands on the bank of a pond is in ruins. The subject is under further study.

BUILDING SURVEY PROJECT (NORTH)

Under the survey of Colonial Buildings in Calcutta, Shubhra Pramanik of the Building Survey Project (North), New Delhi, assisted by Sudhir Kumar, Jatinder Kumar and Shakeel Ahmed, identified buildings on the basis of inscriptional evidence in certain wards. Those include Pusta Raj-Bari, Girish Chandra Ghosh House, Royal Insurance Building, Darbangha House, General Post Office (pl. 165), Esplanade Mansion (pl. 166), Keshav Singh House, Hasting's House (pl. 167), Royal Insurance Building, Old Silver Mint, Treasury Building, Turf Club, Bourne & Sheperhed and a few Residential Complexes like those of Madhusudan Dutta and Kamalalay Stores.

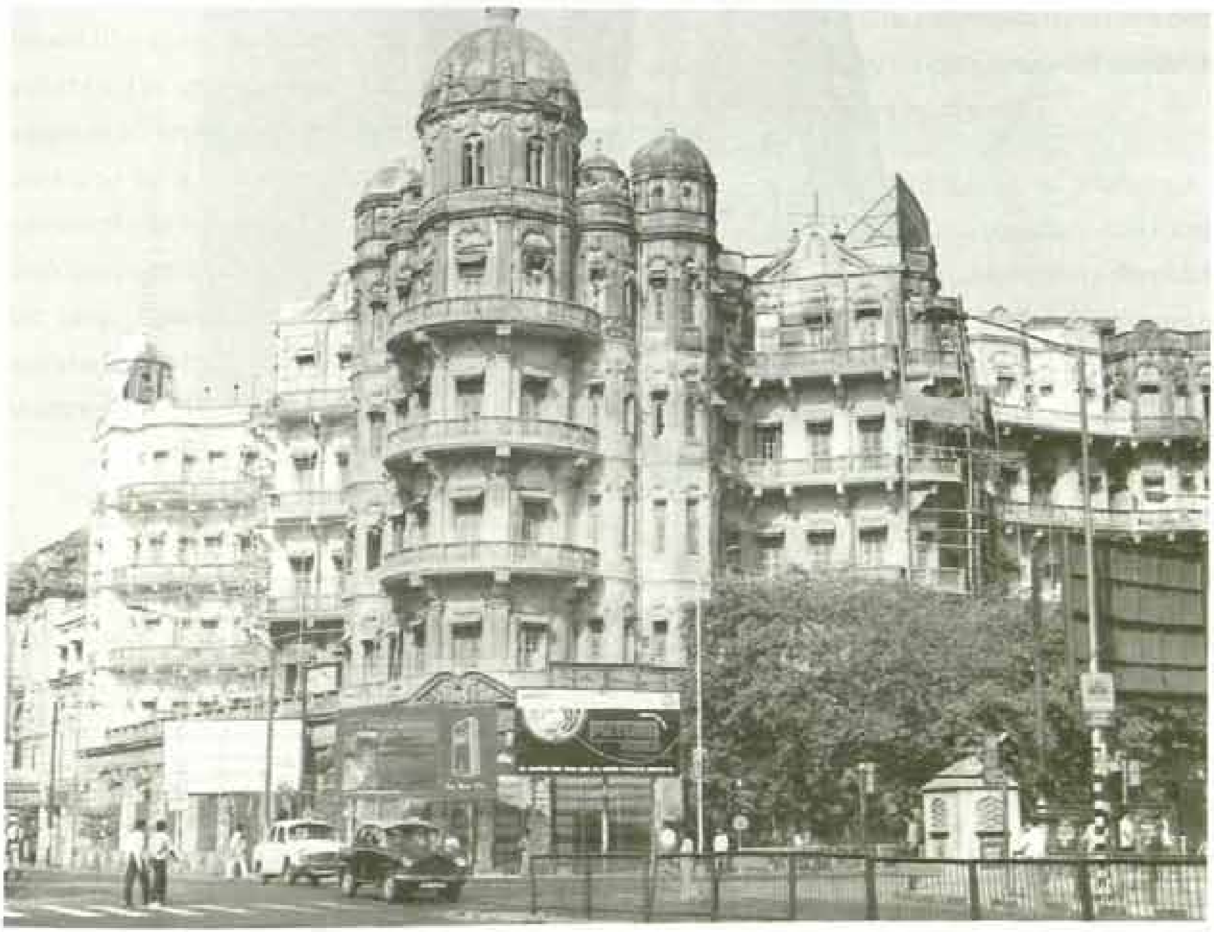
The architectural remains documented include Government House situated on the Northern side of the Esplanade Row. The plan modelled on Kidlestan Hall of Derbyshire built like most of the Calcutta mansions of brick-covered white plaster,

PLATE 165



Calcutta : General Post Office

PLATE 166



Calcutta : Esplanade mansion

PLATE 167



Calcutta, Alipur : Warren Hastings House

consisting of three-storeyed building, the central part of which is having a domed and apsidal front topped by a large figure of Britannia, overlooking the garden and also facing north with large state apartments. It is connected with four passages meeting with four symmetrical wings at the corners and is entered through an arched iron gateway. The roofs having balustrated terraces are shaped like elongated urns with cement-plaster probably. The central block with huge apartment known as a Throne-room for Tipu Sultan's throne, known to be a precious object. It is a Doric-columned marble room, having a drawing room, breakfast room and a supper room measuring 100 feet long. Apart from this it contains a steam operated lift which was perhaps installed in the country for the first time.

Writers Building at Dalhousie Square (north Calcutta), built in AD 1780 is another building of great architectural importance. The building was erected at a large tank to accommodate the civil servants of East India Company (pl. 168-169). This building has nineteen apartments and some rooms in the centre which were from the very beginning used as classrooms for the college of Fort William, designed by the architect Thomas Ryan. The external as well as the internal sides of the building show a symmetrical composition and windows succeeding one another (pl. 170). In all there are fifty-seven sets distributed over two projections articulated by Ionic columns. The later period addition could be seen like the facade with a low pediment. It appears to have been rebuilt in 1880 which is presently being used as the West Bengal Secretariat.

Among other architectural buildings surveyed, the Residence of Michael Madhusudan Dutta (pl. 171), located at 20 B Karlmarx Sarai in Calcutta, is marked by a simple two-storeyed brick building with angular arches and simple round columns datable to the nineteenth century. The entrance is from the western side, that leads to a small open courtyard surrounded by residential quarters on all sides.

The residential-complex of Maharaja of Darbangha entered through a boundary wall located at 42, Chowringhee Road stands now in a dilapidated condition facing the Maidan. It's a three-storeyed building built around AD 1884 (pl. 172), having two minarets on the side bays and are completely dismantled. Most part of the building have been demolished leaving some specimen windows, broken facades and a part of the balcony of the first two floors *viz.,* first and second floor.

During the year under review, a total of twenty five buildings were surveyed and documented by the Department of Archaeology, Government of Gujarat, at Mahesana, Bharuch, Vadodara, Surat, Ahmedabad, Patan and Panchmahals. Of these, three buildings are noteworthy: Swaminarayana Temple, Kalupur, District Ahmedabad (eighteenth century); Seth Nagichand Kapurchand Haveli, Gopipura, District Surat (nineteenth-twentieth century) and Bhadra building, Zarukha, Bhadra, District Vadodara (seventeenth century).

PLATES 168-169



168



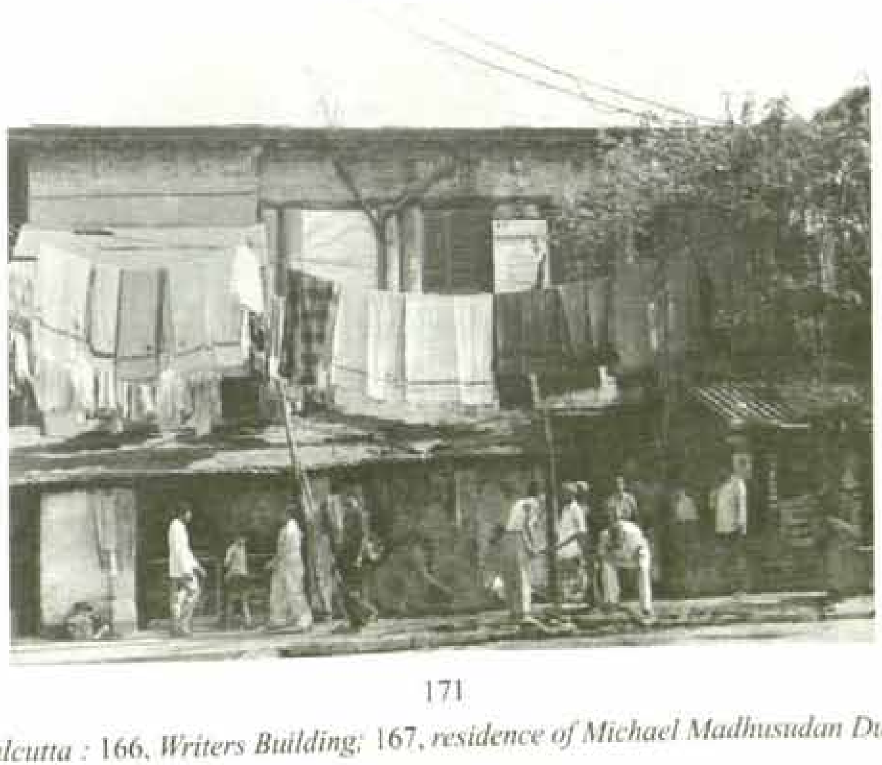
169

Calcutta : 168 *and* 169, *Writers Building*

PLATES 170-171



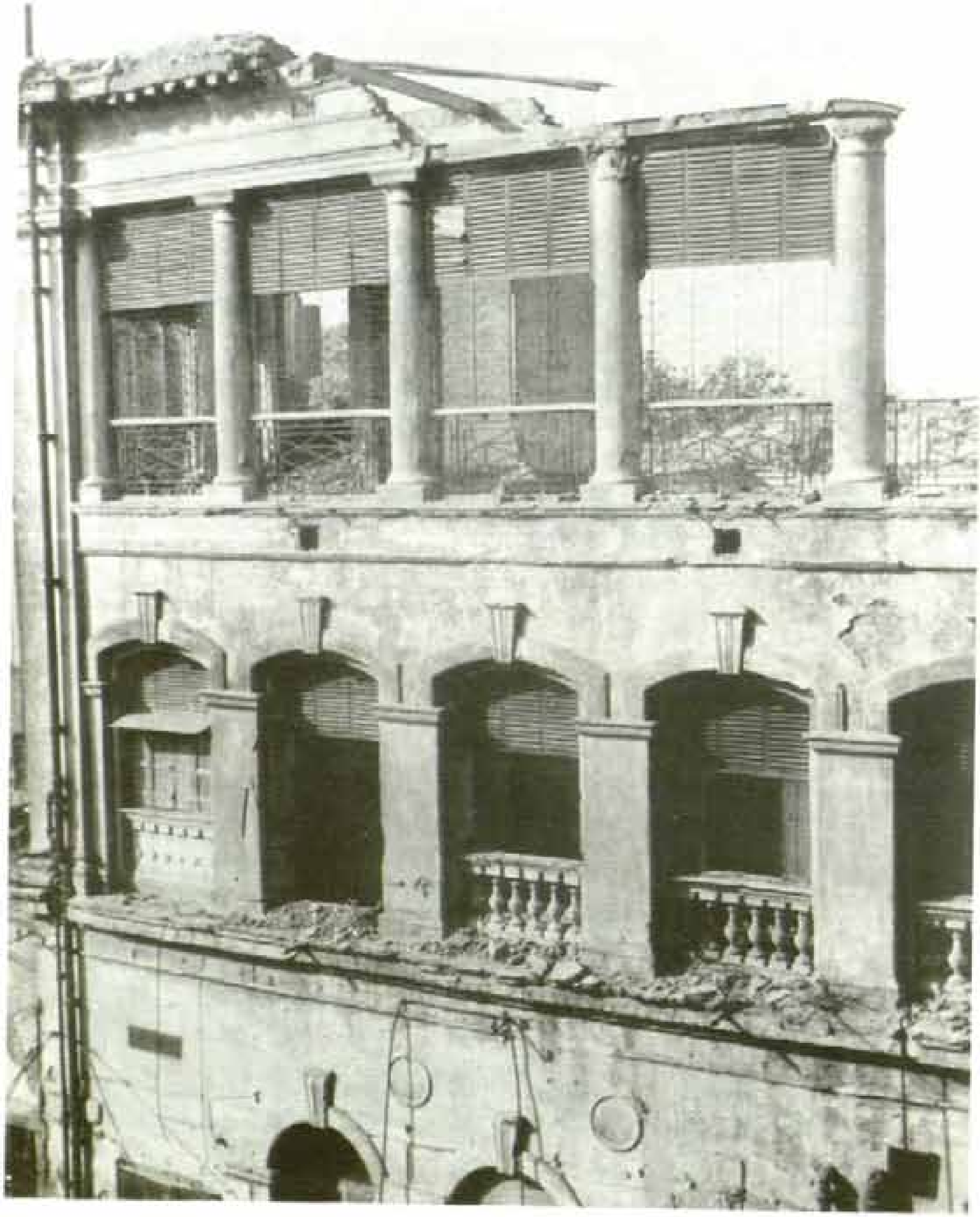
170



171

Calcutta : 166, *Writers Building;* 167, *residence of Michael Madhusudan Dutta*

PLATES 172



Calcutta : palace of Maharaja of Darbhanga

IX. PRESERVATION OF MONUMENTS

AGRA CIRCLE

UTTAR PRADESH

1. AGRA FORT, AGRA, DISTRICT AGRA

At the southern verandah of Anguri Bagh, the restoration of bulged and broken *chhajja* stone was carried out with new stones. The restoration work included the replacement of carved brackets and *dab* stones below the *chhajja* and *farandah* stone at the top. The carved and moulded plaster work was carried out with 1 cement: 1 lime:4 coarse sand mixture, mixed with colour pigment. The restoration work also included stained cement pointing to the stone structures; 150 mm thick, highly carved and moulded plaster on brackets and colour washing to render the surface an even shade.

The pathway of the Diwan-i-Am quadrangle which leads to the verandah on the west side (south-west, west and north-west) was provided with an apron of finely-dressed red sandstone, 65 mm thick. The apron was provided over the freshly laid out lime-cement-concrete. A brick-tile wall was also provided on both the sides of the pathway.

At the Jahangiri Mahal, the restoration of decayed flooring was carried out with 65 mm finely dressed red sandstone flooring (pls. 173-174). The plaster was restored by 25 mm to 40 mm thick plaster in 1 cement: 1 lime:4 coarse sand-mortar mixed with red oxide to match the original surface. The decayed, carved and moulded stones of the ceiling and veneering were also restored. The stained cement pointing to the stone structures including underpinning of the *lakhauri* brick masonry wall was also carried out.

2. CHINI-KA-RAUZA, AGRA, DISTRICT AGRA

The parapet wall and the dome were repaired by underpinning with brick tile and *lakhauri* brick. The plastering work was carried out at missing places of the dome, ground floor of north-east corner rooms, first floor at south-west comer room, wherever missing and decayed.

M.S. gate has been provided to the opening of the main cell and passage leading to the top floor.

3. ITMAD-UD-DAULA'S TOMB, AGRA, DISTRICT AGRA

At the *baradari* located on the river front, the missing white marble inlaid work of the panels of plinth

PLATES 173-174



173



174

Agra Fort, Jahangiri Mahal, pathway : 173, before and 174, after conservation

located on east and south faces has been restored (pls. 175-176) with fresh ones. The missing and decayed red sandstone pinnacle and *chhajja* of the *burj* at the north-east corner was also restored. The replastering work on the inner and outer sides of the same *burj* was also carried out.

The restoration work of the geometerically designed missing black and white marble inlaid stone in red sandstone panels on all the four sides of the main gate were also carried out.

4. Khan-e-Alam Bagh, Agra, District Agra

The western and southern enclosure-wall were found collapsed at certain places and partly bulged. These walls were underpinned with *lakhauri* bricks wherever necessary matching the original work. The open joints of the walls were watertightened using recessed pointing with lime. The seepage at the overhead water tank due to decayed plaster was prevented by replastering the tank with lime mixed with water-proofing compound.

The water channels which feed the overhead tank was also replastered after cleaning it by removing the growth of vegetation and rendering the surface watertight.

The path leading to the Bagh from west gate of Taj was provided with M.S. grill in brick and concrete base. Painting and varnishing has also been rendered.

5. Mehtab Bagh, Agra, District Agra

As per the order of the Hon'ble Supreme Court, the garden-complex was fully desilted and made ready for plantation by the Horticulture Department. The excavated desilted area approximately measures to 70,000 sq m and the average silt removed is 1.05 m. The total volume of silt removed amounts to 73,800 m^2.

During the course of resetting, the base remains of northeastern *burj* came into light. Traces of northern and eastern area of the boundary-wall were also discovered, albeit robbed and badly damaged.

6. Ram Bagh, Agra, District Agra

The red sandstone paved pathways and platforms on the higher terrace located along the river bank were found to be missing and dislodged at many places (pls. 177-178). The pathways at the south-west coiner have been repaired by resetting the dislodged flooring and provided with newly dressed red sandstone flag-stones after laying out a base of lime-concrete wherever required.

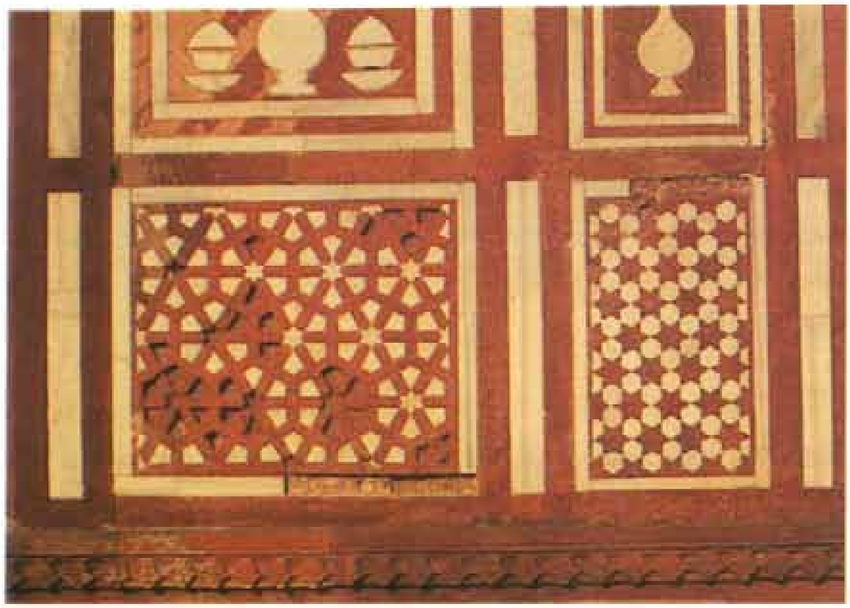
The missing dwarf wall of the *kachcha* pathway leading from main gate to central grass plot has been constructed with brick tiles and *lakhauri* bricks.

The missing red sandstone *jali* railing with *muttaka,* base railing and red sandstone *dasa* at the boundary-wall along the river bank have been restored.

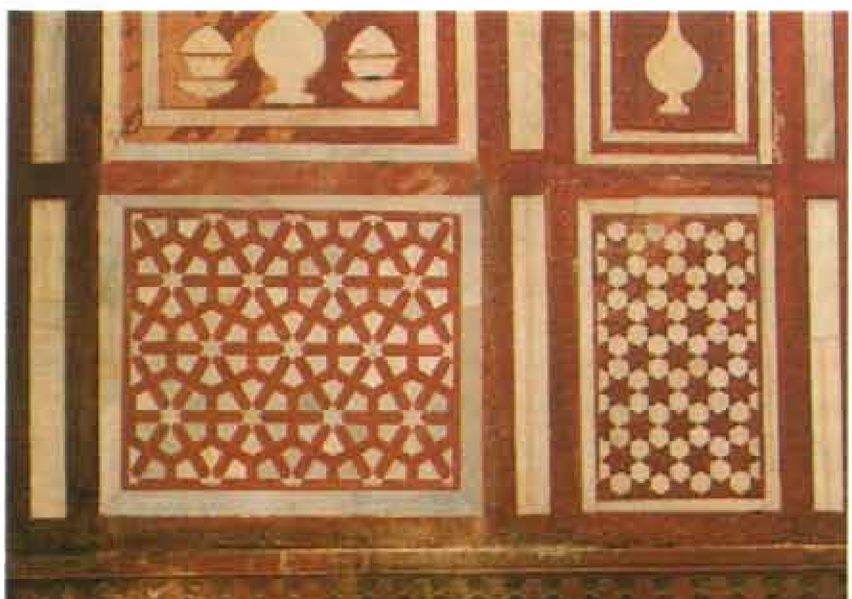
7. Taj Mahal, Agra, District Agra

The red and yellow sandstone flooring of the inner courtyard to east and west of the main entrance gate were decayed and sunken at some places. The decayed stones were removed and replaced with new ones in the original pattern. Restoration work

PLATES 175-176



175



176

Itmad-ud-Daula's Tomb, Agra; inlaid panel : 175, *before and* 176, *after conservation*

PLATES 177-178



177



178

Rambagh, central platform of pathways : 177, *before and* 178, *after conservation*

with new stones was also carried out at sunken facade stones with sunken and embossed mouldings *dab* and *quaid* or string courses, *dasa* stones with pan leaves and floral designs (pls. 179-180) and moulded *galta* of the *dado*.

The missing black and white inlay bars and pieces of various designs and patterns have been provided with new ones. The inlay pieces wherever found loose, were taken out and resetting has been done with special lime-mortar at the same place. The roof of the entrance gate was found to be leaky and hence the old and decayed lime-concrete roofing was scraped and new one laid out, thus preventing the water seepage.

On the inner side of the marble terrace railing of the Taj, the missing black and white inlay bars were provided with new ones as per the original pattern.

On the marble screen of the cenotaph and at the *dado* panels, the missing semiprecious inlay pieces of various floral patterns were provided with new ones and fixed with araldite, and special lime mortar. Some of the semiprecious stones used were carnelian, bloodstone, green jade, mother of pearl, garnet, lapiz lazuli apart from black marble.

At the northeastern *burj* of the Taj-complex, the open joints of white marble *chhatri* was watertightened with recessed pointing. The same work was also carried out at red sandstone veneering walls, *chhajja* stones and facade with combination mortar mixed with red oxide as colouring agent to match the original pattern. The badly decayed red sandstone *chaukhat* and lintel stones were replaced in original pattern, decayed lime-plaster of ceiling with moulding was also restored and replastering carried out at the same *burj*.

The wooden gate of the eastern entrance of Taj courtyard was badly decayed and broken at many places which caused considerable difficulty while opening and closing it. The decayed planks were removed and the new ones provided after dismantling and lowering down the gate. The original pattern was maintained by using the original nails wherever they were found in good condition.

The *dallans* and cells located near the west gate from which emporium stalls were evicted, were repaired partly.

8. Group of Monuments, Fatehpur Sikri, District Agra

At the west wall of Buland Darwaza the restoration of missing white marble inlaid bars and stones in red sandstone panels were carried out. Some of the shapes of restored stones include star, flowers, half flower octagon and haft star.

At the *dargah-complex,* stained cement pointing with cement-sand-mortar mixed with colouring pigment was carried out on the ceiling of the north-east and south-east *dallans.* The old and decayed lime-concrete of Janana rauze, the northern roof of Badshahi Gate and the roof adjoining it on the north were replaced with lime-cement-mortar combined 25 mm sized brick ballast.

PLATES 179-180



179



180

Taj Mahal, Agra, main gate, red sandstone embossed panel : 179, before and 180, after conservation

The restoration of old and decayed red sandstone flooring around the diving well to the west of Buland Darwaza has been carried out with lime-cement-mortar. The drain was also repaired and restored. Stained cement pointing with cement-sand mortar mixed with colouring pigment was carried out at the flooring around the *baoli,* drain and southern steps of Buland Darwaza.

At the Rang Mahal, the decayed flooring of the chamber located at north-east, south-east and on the west were replaced with finely-dressed red sandstone, 65 mm thick after laying out base concrete and rubbed flooring with lime-cement-mortar. Stained cement pointing with cement-sand mortar mixed with colouring pigment has been carried out on the main floor of the courtyard, east and west sides of the rooms of ground floor to strengthen the joints. The decayed plaster has been restored with lime, cement, *surkhi* and cement sand-mortar at the walls of main entrance room of ground floor, rooms on the east and west of ground floor and rooms at the north-east of first floor of the same complex. The restoration of southern wall with coursed rubble stone masonry in lime-cement-mortar was also carried out. The recessed pointing on the coursed rubble stone masonry on the southern wall facing north, eastern wall facing east and west side of parapet-wall was carried out with lime-cement-mortar in the ratio 1:1:2:2. The roof at the north-west was watertightened to prevent leakage of the rain-water. The outer restoration work include the provision of 15 mm thick red sandstone *pandar dasa* on the south, restoration of red sandstone bracket on the north-west and replacement of a 10 cm thick red sandstone slab richly carved over the bracket on the south-east of the Mahal.

At the Stone Cutter's Mosque, the old and decayed red sandstone flooring of the front courtyard and on the south was restored with lime-cement-mortar. The stained cement pointing with cement and sand-mortar mixed with colouring pigment was carried out on the red sandstone flooring at the above mentioned places for strengthening the joints. The restoration of a portion of a dwarf wall around a tree in front of the mosque was carried out with course rubble stone masonry with lime-cement-mortar. A dwarf wall on the east and south of the mosque was also constructed (pls. 181-182) and M.S. grill railing was provided above. The recessed pointing of the coursed rubble stone masonry at the above mentioned dwarf walls was also carried out.

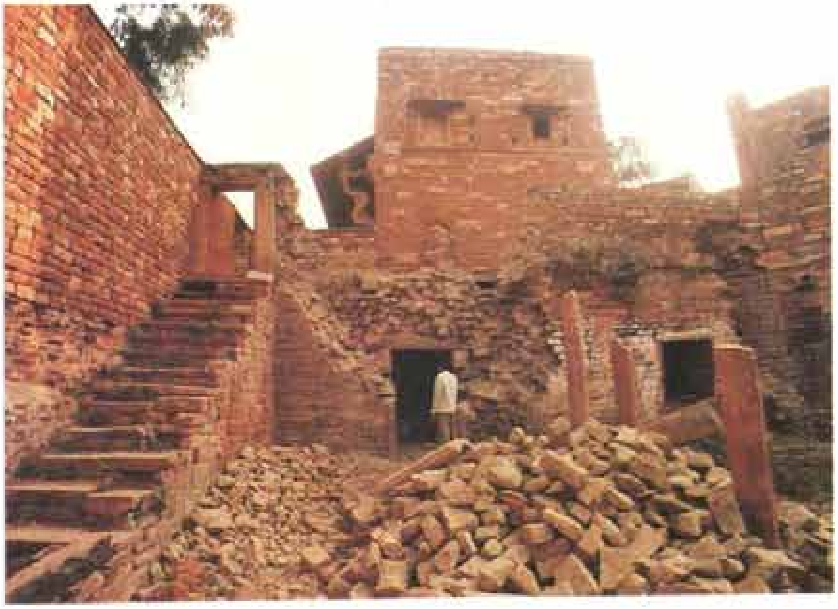
9. Jagner Fort, Jagner, District Agra

The old and decayed roof concrete of the second *chhatri* located on the stairs leading from the base to the top was removed and the relaying work of roof with lime-concrete was carried out. The restoration work also included the resetting of red sandstone roof slabs, red sandstone lintels, brackets, *chhajja, dasa* and pillars.

10. Group of Temples, Dandeshwar, District Almora

The canopy of the *sikhara* and *sukanasika* in wooden frame and covered with tin sheet was very much damaged and unable to prevent water seepage

PLATES 181-182



181



182

Fatehpur Sikri, Stone Cutter's Mosque, collapsed portion of wall:
181, *before and* 182, *after conservation*

and snowfall. The same was replaced with new wooden frame and M.S. sheet. They were painted with grey enamel paint to match the original stone colour.

11. Group of Temples, Jageshwar, District Almora

The stone masonry wall from the Bhogashala to the main gate was found to be badly damaged, bulged and dilapidated at certain places. The damaged portion was dismantled and reset as per the original pattern.

12. Group of Temples, Baijnath, District Bageshvvar

The wall provided on the riverside was damaged due to rains and the same was repaired and strengthened.

13. Rudranath Temple, Gopeshwar, District Chamoli

The stone flooring in front of the temple was found sunken and damaged at some places. The sunken floor was fully removed and dug up to relay the floor. A packing with boulder and rubble stone pitch was laid, over which a layer of R.C.C. slabs was constructed. Then the dressed stone slabs were fixed as per the original pattern. Similarly, the bulged stones were fixed with new ones wherever found bulged. The temple was rendered with original pattern colour wash which also included painting of the canopy, doors etc.

The work of fixing the door *of deodar* wood and fixing notice boards was also carried out.

14. Shah Pir's Tomb, Meerut, District Meerut

The damaged boundary-wall was repaired with tile-bricks, cement, lime and rendered with original red colour powder. The underpinning work was carried out at the defective places in the boundary wall with tiles along with pointing. The flooring of the stone was repaired and plaster work carried out. The entrance gate pillar was made and an iron gate was fixed. A *kharanja* pathway was laid out for the path leading to the entrance gateway.

15. Shah Abdul Razzak Tomb and Mosque, Jhinjhana, District Muzaffarnagar

The damaged and decayed flooring of the mosque and tomb was removed and flooring laid out with bricks, cement-concrete-sand mixture. The plastering of the walls was also carried out at the damaged places, both on the inner and outer wall surfaces.

16. Alibag Fort, Alibag, District Alibag

The old, decayed and fallen veneering stones of the fort wall were replaced by providing fresh veneering stones as per original and neatly pointed with lime-mortar.

AURANGABAD CIRCLE

MAHARASHTRA

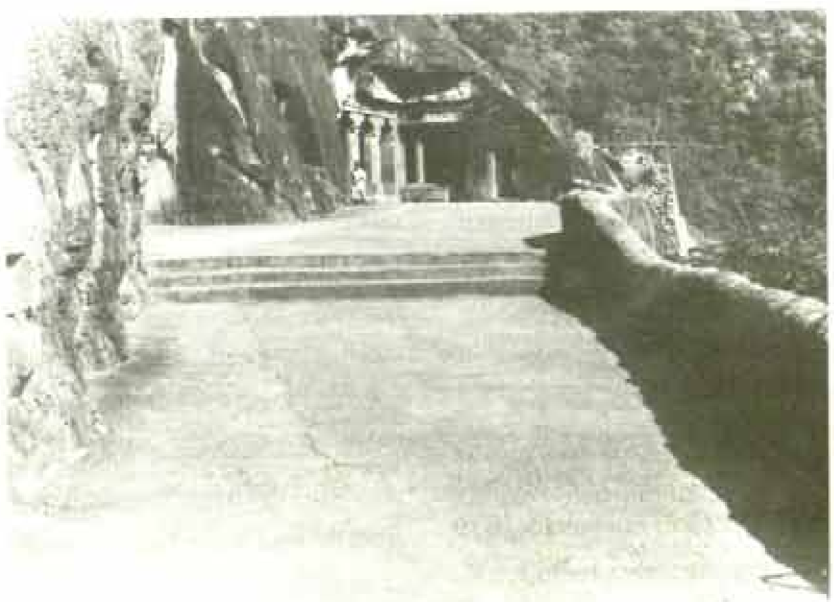
17. Ajanta Caves, Ajanta, District Aurangabad

Widening the pathway for convenience to visitors in front of Caves 1 to 4 (pls. 183-184) was completed by constructing retaining wall towards the riverside, by using uncoursed rubble masonry matched with

PLATES 183-184



183



184

Ajanta Caves (1-4) : 183, *before and* 184, *after widening of pathway*

surrounding by plastering, chiselling etc. The top surface of the widened pathway was also matched with original stone surface.

18. AURANGABAD CAVES, AIJRANGABAD, DISTRICT AURANGABAD

The RCC canopy was provided to the image of Buddha in front of Cave 5, plastered and chiselled to match with original.

19. THATTE NAHAR, AURANGABAD, DISTRICT AURANGABAD

Damaged and broken terracotta water pipe line was removed and provided with hume pipes.

20. DAULATABAD FORT, DAULATABAD, DISTRICT AURANGABAD

The undulated and damaged stone flooring in the open courtyard at the Booking Office was relaid with old and new stones.

21. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

Barbed-wire fencing was provided to the archaeological area around the monument. Cattle trap was also provided at main gate. The decayed and damaged uneven surface of the flooring inside the Caves 7,8 and 10 were removed wherever necessary and attended properly by concreting as per the original. Desilting of the tank near Cave 16 was also carried out for storage of water during rainy season.

22. CHHATRI NEAR GHRISHNESHVARA TEMPLE, ELLORA, DISTRICT AURANGABAD

The broken and missing *chhatri, chhajja* and minarets of the *chhatri* were replaced with RCC as per original. The work of watertightening of the roof was also attended to stop leakage and further deterioration.

23. MALIKAMBER TOMB, KHULTABAD, DISTRICT AURANGABAD

The bulged-out and fallen compound wall was restored in UCR masonry in cement-mortar as per original.

24. PLTALKHORA CAVES, PLTALKHORA, DISTRICT AURANGABAD

The steps from top of the hill to the caves were conserved by resetting with available stones. Rise and tread of the steps were also modified suitably.

25. GONDRAJA'S TOMB, CHANDRAPUR, DISTRICT CHANDRAPUR

The damaged concrete at the rooftop of the tomb was removed and watertightened using fresh lime concrete finished with lime-plaster.

26. CHANGDEV TEMPLE, CHANGDEV, DISTRICT JALGAON

The out-of-plumb *prakara* wall of the temple on the riverside was dismantled and reconstructed in stone masonry with proper foundation, to stop the heavy thrust of backwater of river Treewar Sangam.

27. PANHALA FORT, PANHALA, DISTRICT KOLHAPUR

The dense vegetation was removed including derooting the trees. The dead mortar was removed from the roof of the Teen Darwaja and provided with cement-lime plaster and watertightened. Structural repairs were also carried out with C.R. masonry at fallen portions of the parapet-wall behind Teen Darwaja and Andhar Bav.

28. Kondivate Caves, Kondivate, District Mumbai (Sub-urban)

Rubble masonry flooring was laid in front of Caves 1 to 10 and matched with surrounding after PCC. Highly weathered stone pillars were restored to their original shape and design by providing cement-concrete with non-corrosive steel reinforcement.

29. Ancient Site, Mansar, District Nagpur

Barbed-wire fencing was provided around the area to avoid encroachment and gates were provided at suitable intervals.

30. Foot Wall and Gate, Pauni, District Nagpur

The fallen veneering portion of the fort wall was replaced by providing fresh stone veneering following the original pattern including pointing to the open joints. The roof of the ancient gate was properly watertightened with fresh lime-concrete. Iron grills and doors are provided to the main gate of the fort wall.

31. Pandavlena Caves, Nasik, District Nasik

Dislodged flight of steps from foothill to the caves were reset to its original position with cement mortar and provided recess pointing to the joints. The courtyard in front of caves (on either side of Cave 9) was set right by levelling the area and laying cement concrete over a bed of rubble soling.

32. Gondeshvara Mahadeva Temple, Sinnar, District Nasik

Heavy growth of vegetation around the temple was cleared and barbed-wire fencing was provided to the protected area to avoid encroachment. The leaking *sikhara* of the main temple and sub-shrine have been watertightened by doing liquid lime cement mortar grouting and the exposed surface properly finished by using suitable colour oxides.

33. Bhaja Caves, Bhaja, District Pune

Parapet-wall in rubble stone masonry was constructed along the approach road. The dislodged steps leading to the caves from the foothill were reset and repaired.

34. Shivaneri Fort, Junnar, District Pi nf

The fallen parapet on the inner side of the pathway was restored and huge vegetation from the fort was removed.

35. Pataleshvara Caves, Pune, District Pune

The roof of the *Nandi-mandapa* was properly watertightened after removing the dead concrete and laying fresh cement-lime-concrete. Concrete was provided to the approach pathway and chiselled to match the surrounding.

36. Shaniwarwada, Pune, District Pine

The work executed including the roof terrace of the *naqqarkhana* was replastered with lime-cement mortar after removing the dead concrete and watertightened by using lime-cement-concrete and top finished. PCC was provided around the quadrangle structure known as Godubai laying lime-cement plaster to the floors of various structures. Dislodged and bulging portion of Hazari Karanja (Fountain) was dismantled and reset as per original. The new steels gate was fixed at the main entrance. Wooden barricades were

provided by applying wooden preservatives and laying PCC to the damaged flooring around the *Pushkarini.* Pointing was done to the underground water tank.

37. Elephanta Caves, Gharapuri, District Raigad

Retaining wall was constructed in UCR masonry for providing terraces to develop garden.

38. Raigad Fort, Raigad, District Raigad

The work of restoration of fallen structure of Bazar - peth in mud mortar, providing pointing and watertightening as per original was undertaken. Watertightening the leaky roof of Jagadeshvara Temple and *naqqarkhana* was attended to by laying fresh lime-cement-concrete and top finished.

39. Sindhldirg Fort, Malvan, District Sindhldurg

Removal of thick vegetation from inside and outside the fort wall along with their roots was carried out. Laying of approach road was completed. Desilting of unwanted debris of the water tank was completed.

40. ViJAYADiRG Fort, Vijavadurg, District Sindhi di'rg

The thick vegetation was removed from the main gate and the pathway. The clearance of debris and restoration of fallen portion of the fort wall were carried out.

41. Solapir Fort, Solapir, District Solapir

The old, decayed, fallen veneering stone of outer fort wall was replaced by providing new stones following the original pattern. The top of wall was watertightened.

42. Ambarnath Temple, Ambarnath, District Thane

The recess pointing was provided to the cracks and the gaps on the roof of the temple to stop the seepage of water. The damaged, broken and uneven stone flooring around the temple was attended to by providing stone pavement as per original.

Bangalore Circle

KARNATAKA

43. Fort and Gateways, Bangalore, District Bangalore

The fallen portion of fort wall on the eastern side has been restored as per original. The joints have been pointed in lime-mortar. A stone pavement has been provided over the western fort wall and the joints have been pointed to avoid water percolation to the fort wall.

44. Tipu Sultan's Palace, Bangalore, District Bangalore

A bore-well has been drilled for providing continuous water to the lawns of the Palace.

45. Anantasayana Temple, Anantasayanagudi, District Bellary

The disturbed and out-of-plumb *Kalyana mandapa* of the complex was carefully dismantled and reconstructed after providing a strong foundation in cement-concrete over the natural boulders. The roof was watertightened.

46. Minor Rock Edict of Asoka, District Bellary

A pillared *mandapa* has been constructed to provide shelter to the Edict and the roof has been

covered with granite slabs and the joints pointed. A stone paved floor has been provided around the Edict.

47. Chandrasekhara Temple, Kamalapur, District Bellary

Coping stone was provided to the enclosure walls as per the original.

48. Mahanavami Dibba, Kamalapur, District Bellary

The fallen and the out-of-plumb enclosure-wall on the northern side of the Mahanavami Dibba has been reconstructed by providing corefilling in rubble and gravel.

49. Underground Siva Temple, Kamalapur, District Bellary

The debris accumulated inside the temple has been removed without disturbing the original layout. The choked-up drainage has been made functional by removing the debris. The leaky roof of the temple has been watertightened by laying fresh lime-plaster after removing the old and decayed one.

50. Achutaraya Temple, Venkatapura, District Bellary

The masonry props provided to the inner *prakara* wall on the eastern side was carefully removed. The bulged-out and fallen portion *of the prakara-wall* was reconstructed after providing a foundation in stone masonry over a cement-concrete bed.

51. Minor Rock Edict of Asoka, Udegolam, District Bellary

A pillared *mandapa* has been constructed to provide shelter to the inscription; the roof has been provided with granite slabs and the joints have been pointed.

52. Amruteshvara Temple, Amritapura, District Chikmagalur

The disturbed outer wall of the *navaranga* has been dismantled and reconstructed as per original after mending the damaged architectural members.

53. Vlranarayana Temple, Belawadi, District Chikmagalur

Crimped mesh fencing over a dwarf wall around the temple was provided.

54. Pre-Historic Site, Chandravalli, District Chitradurga

The site has been fenced with barbed-wire by providing RCC Pillars. A gate was provided to the entrance.

55. Fort and Temples, Chitradurga, District Chitradurga

The damaged portion of the fort wall near the *Kamanabagilu* was restored. The retaining wall between the third and fourth entrance was reconstructed. Flooring was provided to the Murugarajendra Muth in combination mortar and a collapsible gate has been provided. The roof of the Gopalakrishna Temple was watertightened.

56. Raja's Seat, Mercara, District Coorg

The damaged roof members like wooden rafters, creepers and Mangalore tiles were replaced with new ones. The structure was given a coating of water-proof cement paint.

57. Kalleshvara Temple, Ambali, District Davanagere

The roof of the temple was watertightened after removing the dead lime-plaster and providing a fresh *surkhi* and lime-plaster water-proof course.

58. Jaina Basadi, Halebid, District Hassan

The dislodged outer veneering wall on the eastern side of the Shantinatha Basadi has been reconstructed as per original by utilising the original members.

59. Someshvara Temple, Kolar, District Kolar

The main entrance tower of the temple has been watertightened by filleting the joints in combination mortar.

60. Mallikarjuna Temple, Basral, District Mandya

The leaky roof was watertightened after raking the old, dead water-proof course. The missing portion of the parapet has been reconstructed. The wide gaps of the Vimana were filled with stone chips and lime-mortar to avoid water percolation.

61. Gumbaz, Srirangapatna, District Mandya

A leaky wooden railing has been provided around the tombs to restrict movement of the tourists.

62. Vljayanarayana Temple, Gljndluped, District Mysore

The damaged plaster over the brick masonry wall of the *mukha-mandapa* has been removed and replastered in combination mortar. The joints of the stone pavement is pointed in cement-mortar. The open area on the western side of the temple is enclosed by construction of a size stone masonry wall to a height of 1.5 m. M.S. grill gate has been provided to the ornamental *mandapa.*

63. Sreekanteshvara Temple, Nanjangud, District Mysore

The damaged stucco figures of the *vasanta mandapa* has been mended as per original in combination mortar. The joints of the stone pavement was pointed in cement-mortar.

64. Keertinarayana Temple, Talkad, District Mysore

Two small sub-shrines located on the north and north-east of the temple-complex, a wall and the kitchen of the temple which were buried under sand dunes were carefully exposed (pls. 185-186).

65. Gaurishvara Temple, Yelandur, District Mysore

The size stone masonry wall was watertightened and the joints were pointed in cement-mortar. M.S. gate was fixed at the eastern entrance.

66. Narayanasvamy Temple, Yelandur, District Mysore

The surface of the entrance *gopura* parapets, superstructure over the shrines and niches were cleaned. A fresh coat of snowcem in matching colour was applied.

67. Tripuranteshvara Temple, Balligavi, District Shimoga

The *adhishthana* of the eastern portion of the temple which is out-of-plumb has been dismantled and reconstructed as per original.

PLATES 185-186



185



186

Keerthinarayana Temple : 185, *before and* 186, *after removal of sand dunes*

68. REM KAMBA TEMPLE, CHANDRAGUTTI, DISTRICT SHI.MOGA

The missing *prakara* wall on the eastern side has been reconstructed by using available stone blocks. A portion of the missing stone flooring at the entrance has been provided.

69. AGHORESHVARA TEMPLE, IkKERI, DISTRICT SHIMOGA

The leaky roof of the temple has been watertightened. Missing portions *of the prakara* wall has been reconstructed. Plinth protection course has been laid around the temple.

70. FORT, KAVALEDURGA, DISTRICT SHIMOGA

The thick rank vegetation grown on the fort walls and pathways has been removed.

71. JUMMA MASJID, SIRA, DISTRICT TUMKUR

The whitewash over the minarets and the dome has been carefully removed. The stucco figures of the minarets have been mended as per original and water-proof cement-paint-coating has been applied. The roof of the Masjid has been watertightened in combination mortar.

72. HILL, FORT AND RUINED PALACE, UCCHANGIDURGA

The debris accumulated over the ancient structures inside the fort near the king's palace has been carefully removed. The work is in progress.

BHOPAL CIRCLE

MADHYA PRADESH

73. FORT, ATER, DISTRICT BHIND

In continuation of the last year's work *(1996-97,* p. 251), repairs at the first and main gate have been completed. Underpinning and restoration of the damaged walls and recess pointing have been completed. Necessary repairs have also been taken up in the Dewan-e-Khas and desilting of ancient well.

74. CHAUSATH YOGINI TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Debris clearance of fallen platform Jagati wall by sorting out useful stones and stacking at proper place and reuse in restoration of the damaged wall and throwing of rubbish outside the temple area are in progress.

75. DLLADEO TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Replacement of the old damaged and worn-out G.I. barbed-wire fencing on angle iron post with stone masonry dwarf wall mounted with M.S. grill for safety of the valuable sculptures is in progress.

76. EASTERN AND SOUTHERN GROUP OF TEMPLES, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the last year's work *(1996-97,* p. 253), watertightening of the open joints of the temples under these groups is in progress to check leakage of water during rainy season. Excavation has also been taken up around Parsvanatha Temple to expose the original *jagati* of the platform which revealed original platform and remains of ancient temple structure belonging to eight-ninth century AD. The work has been completed.

77. KANDARIA MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the last year's work *(1996-97,* p. 253), watertightening of the temple by sealing open

vertical joints to check the ingress of rain-water is in progress. Treatment of approach road from Kandaria Mahadeva Temple to Chausath Yogini Temple gate with lime-concrete for easy movement of visitors is also in progress. An apron around the *jagati* has also been provided to check percolation of water into the foundation. The work has been completed.

78. LAKSHMANA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the last year's work *(1996-97,* p. 253), watertightening of Lakshmana Temple by sealing the open joints to check the ingress of rain water has been completed. Trial-trenches have been laid on the south of the temple to ascertain the depth of foundation of the temple and platform. Tubular scaffolding has been erected for lowering down tilted S.E. sub-shrine stone-by-stone. The work is in progress for re-erection of the same in plumb and alignment after strengthening the foundation.

79. VAMANA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Replacement of old damaged and worn-out G.I. barbed-wire fencing on angle iron post with stone masonry dwarf wall mounted with M.S. grill for safety of valuable sculptures is in progress.

80. BUDDHIST CAVES, BAGH, DISTRICT DHAR

In continuation of the last year's work *(1996-97,* p. 253), the dismantling of decayed and damaged rock-cut cells and pillars of Cave No. 2 and their reconstruction matching the original has been completed. Erection of scaffolding, centering and shuttering in Cave No. 7 are also in progress for construction of RCC slab and beams in place of the missing slab and beams.

81. DARVA KHAN'S MOSQUE, MANDU, DISTRICT DHAR

In continuation of the last year's work (*/ 996-97,* p. 253), extraction of limestone slabs departmentally from leased quarry at Zeerabad and transportation of the same to Mandu for use in flooring has been completed. Replacement of old, decayed, damaged and sunken stone flooring with fresh fine chisel-dressed limestone flooring has been completed. Providing and fixing fresh fine chisel-dressed limestone *chhajjas* in place of the damaged and missing ones has also been completed.

82. JAHAZ MAHAL, MANDI, DISTRICT DH\R

In continuation of the last year's work *(1996-97,* p. 253), restoration of damaged and missing rear arches of Jahaz Mahal in R.R. stone masonry in *lime-surkhi* and sand-mortar has been completed. Restoration of damaged and missing *chhajjas* with fresh fine chisel-dressed limestone *chhajjas* as per original is in progress. Plastering of domes is also in progress.

83. KAPOOR TANK, MANDI, DISTRICT DHAR

Repairs to the enclosure wall and terrace around the tank has been completed. A repair to Taveli Mahal and closing the arch opening with M.S. grill/wiremesh has been completed. Restoration of arches of pavilion with fine chisel-dressed limestone is in progress.

84. REWA KI NO, MANDI , DISTRICT DHAR

Debris removal of fallen structures and repairs to structures and tank have been completed. Extraction of limestone slabs from Zeerabed quarry

and its transportation to Mandu, fine chisel dressing and fixing in tank are in progress.

85. ROOPMATI PAVILION, MANDU, DISTRICT DHAR

In continuation of the last year's work *(1996-97,* p. 254), extraction of limestone slabs from leased Government quarry at Zeerabad departmentally and dressing of the stone slabs as per requirement for undertaking restoration of the damaged dome is in progress. Lowering down of the half dome to restore it in plumb and alignment has been completed. The dismantled wall after strengthening the foundation has been restored in plumb and alignment in R.R. stone masonry. Restoration of pillars to reconstruct the dome has been taken up and completed. Plastering of dome is in progress.

86. JAMA MASJID, CHANDERI, DISTRICT GUNA

Restoration of damaged and bulged rear wall in ashlar stone masonry in lime-mortar, in plumb and alignment is in progress.

87. KOSHAK MAHAL, CHANDERI, DISTRICT GUNA

Collection of cut stone blocks and fine chisel dressing of the same for use in restoration of damaged and missing wall and balconies are in progress. The roof terrace has been watertightened by laying of fresh lime-concrete in place of the damaged and decayed one.

88. NAVKHANDA PALACE, HILL FORT, CHANDERI, DISTRICT GUNA

Removal of debris of fallen structures, sorting out useful stones and stacking of the same for reuse in conservation and disposal of waste is in progress.

89. GROUP OF TEMPLES, KADWAHA, DISTRICT GUNA

In continuation of the last year's work *(1996-97,* p. 254), enclosing the area of Temple Nos. 9, 10,11 and 12 with G.I. barbed-wire fencing on angle iron posts for safety of the temples and to check the encroachment has been completed. Enclosing the area of other group of temples with G.I. barbed-wire fencing on angle iron post and repairs to dry stone masonry wall of Garhi in plumb and alignment have been completed. The damaged Garhi Walls have been conserved.

90. MANSINGH PALACE FORT, GWALIOR, DISTRICT GWALIOR

The lime-concrete of the roof terrace of Manmandir complex which had considerable decay and was allowing leakage of rain-water, is being dismantled to relay the same to arrest the seepage of water. The work is in progress. The top of the parapet-wall has been provided with stone masonry coping finished with lime-plaster to check the ingress of rain-water.

91. TELI-KA-MANDIR, GWALIOR FORT, DISTRICT GWALIOR

Dismantling of flag-stone flooring and C.R. stone masonry enclosure wall of the platform has been completed. Excavation around the platform to find out the foundation details is in progress. M.S. grills have been procured to fix on the compound-wall in the south to check trespassing.

92. TOMBS OF MOHAMMAD GHAUS AND TANSEN, GWALIOR, DISTRICT GWALIOR

In continuation of the last year's *(1996-97,* p. 254) work, relating to development of garden

on the front and rear side of the complex is in progress. New Chinese grass carpet and hedge are being laid in front lawns. The replastering work of the main dome has been taken up and the same has been completed after erection of scaffolding with steel tubes and covering the grave with M.S. sheet cover to avoid any damage to the grave and injuries to the visitors. Providing and fixing stone edging around the flower bed and plantation of plants are in progress.

93. Idgah, Asirgarh, District Khandwa

Dismantling of damaged and missing wall of the platform for restoration of the same in plumb and alignment with original size stones is in progress.

94. Ahukhana, Burhanpur, District Khandwa

Debris clearance of fallen structures and opening of closed water channels have been completed. Replacement of old, decayed and damaged flooring of the pavilion with fresh lime-concrete has been completed. The tank in front of the pavilion had been taken up for repairs and the work was completed.

95. Compound Wall at Sculpture Shed, Un, District Khargone

In continuation of the last year's work *(1996-97,* p. 254), excavation of foundation and laying of foundation concrete has been completed. The work of construction of stone masonry dwarf wall mounted with M.S. grill is in progress. The work of boring a tube well for water supply in the complex and construction of sculpture sheds is in progress.

96. Group of Temples, Bateshvara, District Morena

In continuation of the last year's work *(1996-97,* p. 254), the removal of fallen debris of temples and sorting of architectural members for resetting and restoration of the Mandapika shrines with available members are in progress. Enclosing the area with G.I. barbed-wire fencing on angle iron posts to check encroachments has almost been completed.

97. Ekottarso Mahadeo Temple, Mitauli, District Morena

Excavation of the flooring and throwing of debris outside the temple to find out the original stone flooring for relaying of the same with fresh chisel-dressed stone flooring is in progress.

98. Garhi, Padawali, District Morena

In continuation of the last year's work *(1996-97,* p. 254), jungle clearance around the Garhi excavation of settled debris, sorting and stacking of useful stones and, reuse in conservation of Garhi wall and bastion, throwing of rubbish away from the monument and levelling of the area are in progress. Dismantling of bulged and out-of-plumb wall for conservation of the same in plumb and alignment with original moulded stones is also in progress.

99.kakanmath temple, sU'hania, district Morena

Dismantling of bulged and *out-of-plumb jagati* platform in the north has been completed. Excavation for providing proper foundation and retaining wall to avoid settlement has also been

completed. Cement concrete in foundation has been laid and restoration of *jagati* in plumb and alignment has also been taken up and work is in progress.

100. ROCK-SHELTERS, BHIMBETKA, DISTRICT RAISEN

Extension of the G.I. barbed-wire fencing on RCC posts to avoid unauthorised entry of visitors from the far end and treatment to approach pathways leading to rock-shelters with flat stones laid in concrete for easy movement of visitors are in progress.

101. SIVA TEMPLE, BHOJPUR, DISTRICT RAISEN

In continuation of the last year's work *(1996-97,* p. 255), excavation of sandstone blocks from Government leased quarry departmentally and transportation of the same to the site for restoration of balcony in the north and ceiling are in progress. Chiselling of the stone slabs of required size for the restoration of missing pieces and *pranala of gauri-patta* and the northern balcony is also in progress. Refixing of comer base stones of ringed ceiling at their original place and clamping with copper clamps fixed in lead is also in progress. All the missing iron clamp of roof members was replaced with copper clamps. Efforts are also made on to cover the ceiling gap between inner edge of the wall and the beams with original architectural members scattered on the ground. The work of carving of lower piece of the missing northern pilaster facing west of the *dvara-sakha* and fixing the same at original place has been completed. Dressing and carving of middle bell piece of northern pilaster is in progress.

102. BUDDHIST SITE, SANCHI, DISTRICT RAISEN

hi continuation of the last year's work *(1996-97,* p. 255), the base of ancient Tank No. 2 has been packed with stone soling and laid with cement concrete. Laying of a layer of stone pitching over the base concrete has also been completed. Laying of layer of ferro cement-concrete has also been completed. Reconstruction of original stone steps has been taken up and is in progress. Laying of pipe line from colony to stupa is in progress. Replacement of G.I. barbed-wire fencing on angle iron posts with stone masonry dwarf wall mounted with M.S. grill from entrance to Public Health Engineering Department water tank to check trespassing is in progress. Excavation of pits and plantation around Sanchi to bring back the greenery are also in progress. The remaining work of revival to Tank No. 1 and watertightening of walls of ancient remains are also in progress.

103. BUDDHIST MONUMENTS, SATDHARA, DISTRICT RAISEN

In continuation of the last year's work *(1996-97,* p. 255), restoration of damaged and missing walls of platform of Stupa No. 1 in plumb and alignment is in progress. Restoration of Monastery No. 1 in plumb and alignment has been completed. The restoration work of Stupa Nos. 3, 4, 6 and 7 in plumb and alignment as per originals has also been taken up and is in progress.

104. SIVA TEMPLE, MANDI BAMORA, DISTRICT SAGAR

Replacement of old worn-out G.I. barbed-wire fencing on angle iron posts with stone masonry dwarf wall surmounted with M.S. grill and conservation of

the porch of the temple by providing the missing stone beams is in progress.

105. RUINED PALACE, FORT, RAHATGARH, DISTRICT SAGAR

In continuation of the last year's work *(1996-97,* p. 256), the restoration of damage and missing *chhajjas* with fresh fine chisel-dressed stone *chhajjas* is in progress. Restoration of missing pillars, brackets, beams and slabs with fresh fine chisel-dressed stone pillars, brackets, beams and slabs is in progress. The repairs to the main gateway and the pathway have also been taken up and are in progress.

106. BUDDHIST MONUMENTS, PANGURARIA, DISTRICT SEHORE

In continuation of the last year's work *(1996-97,* p. 256), the restoration of damaged, missing and out-of-plumb platform wall was undertaken. The work has been completed. Restoration of stupa in plumb and alignment is in progress. The ruined stupa opposite the main stupa has been traced after removing the fallen and dislodged stones.

107. GADARMAL TEMPLE, BADOH PATHARI, DISTRICT VIDISHA

Dismantling of bulged *jagati* platform for resetting in plumb and alignment after providing proper foundation is in progress.

108. HINDOLA TORAN, GYARASPUR, DISTRICT VIDISHA

Scientific debris clearance and exposition of ancient remains of the temple is in progress. The work of restoration of damaged and missing layers *of jagati* of temple in ashlar stone masonry reproducing original mouldings upto available height has been completed.

109. NEELKANTHESVARA TEMPLE, UDAIPUR, DISTRICT VIDISHA

Scientific debris clearance and exposition of covered *jagati* of the temple in the south has been completed.

110. BIJAMANDAL, VIDISHA, DISTRICT VIDISHA

In continuation of the last year's work *(1996-97,* p. 256), excavation of settled debris and throwing and filling the surplus material in the depression on the rear side and replacement of G.I. barbed-wire fencing on angle iron posts with stone masonry dwarf wall mounted with G.I. barbed-wire fencing on angle iron posts is in progress.

BHUBANESWAR CIRCLE

MADHYA PRADESH

111. PATALESVARA TEMPLE, MALHAR, DISTRICT BILASPUR

Cordoning of one acre of newly acquired site for the proposed museum building is provided by M.S. angle barbed-wire. The work is in progress.

112. LAXMAN TEMPLE, SRIPUR, DISTRICT MAHASAMUND

Dilapidated southern wall of the Laxman Temple complex was dismantled and re-erected as per original.

ORISSA

113. BARABATI FORT, CUTTACK, DISTRICT CUTTACK

Restoration of citadel wall of Barabati Fort has been taken up and the work is in progress. Water-tightening of the pyramidal structure of the excavated fort area is successfully attended to.

114. KEDARESVARA TEMPLE, KEDARESVARA MOUZA, CHOUDVAR FORT REMAINS, CHOUDVAR, DISTRICT CUTTACK

Restoration work of the missing *upper jangha* part of the temple is in progress.

115. GROUP OF TEMPLES, KOTAKOLA, DISTRICT GANJAM

The group of temples was taken up for conservation in the form of face-lifting, rectification of structural defects of the *sikhara,* watertightening, relaying of the undulated surface of the courtyard, etc.

116. MAHAKALA TEMPLE, EXCAVATED BUDDHIST SITE, RATNAGIRI, DISTRICT JAIPUR

The dilapidated Mahakala Temple was subjected to dismantling. Accordingly, G.I. tubular scaffolding around the temple was provided.

117. BAKRESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

Pointing, edging, filleting work was attended to the boundary-wall. The undulated and damaged floor/ pavement has been reset as per original.

118. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

Smaller sub-shrines which were leaning in the temple-complex were dismantled for construction and then conserved in the original pattern. Besides, another small sub-shrine in the temple-complex was also dismantled and re-erected as per original. Watertightening of three small sub-shrines on the south-west corner has been taken up and the work is in progress.

The work of pointing and grouting the *sikhara* of Parvati Temple on north-west corner of the complex has been taken up with simultaneous chemical treatment. The work is in progress.

Pointing work of the well inside the temple-complex (the water of which is used for *bhoga-prasada* and the construction of a drain within the temple have been completed)

119. MUKTESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

The work of rectification of disturbed and sunken floor of the complex was done by replacing newly dressed stone blocks. Pointing and grouting work of the small shrines in-between Siddhesvara and Muktesvara Temples has also been attended to.

Pointing work to the wide joints of laterite dwarf wall and sub-shrines in the temple-complex was also attended to.

120. RAMESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

Dwarf boundary-wall of laterite stones has been erected on the west and northern side of the complex.

121. YAMESVARA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

The undulated floor of Yamesvara Temple was re-laid with dressed uniform stone blocks as per

original after the removal of the worn-out/damaged stones of the floor.

122. Udayagiri-Khandagiri Caves, Bhubaneswar, District Khurda

Construction of dwarf and laterite boundary wall around the monument on the front portion of Udayagiri hill, parallel to public road has been completed.

123. Rasika Raya Temple, Haripurgarh Fort, District Mayurbhanj

In continuation of the previous year's work *(1996-97,* pp. 258-259), missing front portion of terracotta temple has been restored as per original. Reconstruction of superstructure over the pillars to relay the missing western roof of the temple is in progress. Work upto the roof level has been completed.

124. Jagannatha Temple, District Puri

In continuation of the previous year's work *(1996-97,* p. 259), the damaged *amalaka* stones of the main temple were replaced in original position. The conservation of southern portion of *vimana* is in progress. All the broken and dilapidated stones of *rahapaga* were replaced.

The damaged roof of *dadhivamana* shrine inside the Jagannatha Temple-complex was re-laid with reinforced cement-concrete.

The restoration of the Sarasvati Shrine inside the temple premises was completed.

Restoration and resetting of loose and missing battlement stones of the southern side *of kurmibeda* (inner enclosure wall) was attended to. The battlement stones of *kurmibeda* were reset in their original position following archaeological norms.

Construction of new dwarf wall on the outside of the Meghanad Prachir (outer enclosure wall) of the Jagannatha Temple was done.

125. Dakshaprajapati Temple, Banapur, District Puri

In continuation of the previous year's work *(1996-97,* p. 258), the damaged, bulged-out *rahapaga* of the western side of the temple was rectified and reset.

Conservation of north-west corner of *kanikapaga* and *anurahapaga* of the *sikhara* of the main temple was done in the form of pointing, grouting, underpinning etc.

Much dilapidated eastern *rahapaga* of the *sikhara* of the main temple was thoroughly dismantled and restored as per original.

Pointing and grouting of the inner side of *garbhagriha* including the replacement of missing and broken stones has been done.

Besides, resetting of the remaining out-of-plumb eastern *rahapaga* upto *beki* level was done.

126. Sun Temple, Konarak, District Plri

Paved laterite rampart has been constructed in the northern side of the temple connecting the monolithic elephant duo on pedestal. Widening of the laterite pathway in south-west side of *jagamohana* is in progress.

CALCUTTA CIRCLE

WEST BENGAL

127. SIDDHESVARA TEMPLE, BAHULARA, DISTRICT BANKURA

Restoration of ornamental brickwork on the temple facade and *mukha-mandapa* with special-sized bricks was completed. The angle iron posts of the barbed-wire fencing around the temple were repainted. Deep rooted trees on the temples were cut off and removed.

128. GROUP OF TEMPLES, BISHNUPUR, DISTRICT BANKURA

Lightening conductors were provided to Kalachand, Radha Madhaba, Madanagopala, Mallesvara, Nandalal, Lalji, Radhashyam, Madanamohana and Muralimohana Temples. Square nets were fixed on the barbed-wire fencing around Kalachand, Nandalal and Radhagovinda Temples to prevent the entry of animals to save the nursery bed and gardens developed by the Horticulture Branch of the Survey. Wherever necessary, the damaged barbed-wire fencing around these monuments was repaired and synthetic enamel painting was provided on the angle iron. Lime-concrete on the platform of the Radhagobinda Temple was provided along with the 1 m wide brick apron around the temple. The ceiling of the portico was replastered after removing the old and dead lime-plaster.

129. RADHAGOBINDA TEMPLE, BISHNUPUR, DISTRICT BANKURA

The undulated area of the temple premises was filled up with the loose earth to check the stagnation of water. Barbed-wire fencing around the monument and its retaining wall were repaired as per the original.

130. RADHAMADHABA TEMPLE, BISHNUPUR, DISTRICT BANKURA

The broken compound-wall of the temple along with its coping was repaired. The missing and broken barbed-wire fencing around the monument was replaced by a new one. The weak foundation of the temple was strengthened in stone masonry.

131. STONE GATEWAY, BISHNUPUR, DISTRICT BANKURA

In continuation of the previous year's work (*1996-97,* p. 260), stone masonry of the plinth of the retaining wall was completed and the plinth of the stone gateway was stabilised. The roof of the gateway was watertightened with the *lime-surkhi* and its inner walls were plastered with lime.

132. GOKULCHAND TEMPLE, GOKULNAGAR, DISTRICT BANKURA

Deep rooted trees from the monument were removed and the vegetational growth in the temple premises was cleared. In order to protect the foundation of the boundaries as well as the bulged out stone masonry, the southeastern corner of the boundary-wall was repaired by resetting the laterite stone members after carefully numbering and dismantling the stone members of the bulged-out walls. The masonry wall was brought to plumb by resetting the stone members with dry core masonry.

133. SHYAMSUNDAR TEMPLE, MADANPUR, DISTRICT BANKURA

The barbed-wire fencing around the monument was repaired and the angle iron posts were painted. Approach road to the monument was repaired and the growth of vegetation in the premises was removed.

134. ROCK INSCRIPTION OF CHANDRAVARMAN, SUSUNIA, DISTRICT BANKURA

Vegetational growth around the inscription was cleaned. The approach road to the site was provided.

135. TEMPLE OF RADHABINOD COMMONLY KNOWN AS JAYADEVA-KENDULI, DISTRICT BIRBHUM

Clearance of vegetation was done and angle iron posts of the barbed-wire fencing were cleaned and painted.

136. DAMODAR TEMPLE, SURI, DISTRICT BIRBHUM

Conservation of the plinth of the temple and laying of approach road to the temple were completed.

137. TWO ANCIENT TEMPLES, BAIDYAPUR, DISTRICT BARDHAMAN

After removing the roots of the deep rooted trees, the damaged portion of the temple was brought to its original position. The damaged portions of the *sikharas* and the outer facades of the temples were attended to.

138. GROUP OF FOUR ANCIENT TEMPLES, BEGUNIA, DISTRICT BARDHAMAN

In continuation of the previous year's work (*l996-97,* p. 260), after removing the deep roots of the trees, necessary repairing and pointing were done on outer facade of the temples. Caused by decayed mortar, it was filled by the recess pointing method. Lightening conductor was provided to one of these temples.

139. ANCIENT MOUND, BHARATPUR, DISTRICT BARDHAMAN

The damaged and missing portion of the exposed stupa was brought to its original form. Recess pointing work, wherever necessary, was done on the remaining portions of the structures.

140. TOMB OF SHER AFGHAN, NAWAB QUTBUDDIN AND BAHARAM SAKKA, BARDHAMAN, DISTRICT BARDHAMAN

In continuation of the previous year's work (*1996-97,* p. 260), lime-concrete floor was relaid at the entrance gate. The front facade of the entrance gate and the retaining wall near the tank were replastered after raking out the dead plaster.

141. JAINA BRICK TEMPLE KNOWN AS SATDEUL, DEULIA, DISTRICT BARDHAMAN

The damaged and missing portions of the facades of the temple were repaired. Recess pointing work was done on the outer facades of the temple.

142. GOPALJI TEMPLE-COMPLEX, KALNA, DISTRICT BARDHAMAN

Bricks of the salt-affected damaged portion of the temple and its boundary-wall were removed and reset. Damaged pillars and arches of the temple were repaired. Ornamental terracotta panels

covered under thick plaster were exposed and restored. Necessary grouting and pointing have been done to strengthen the structure on the rear side and left side of the main temple. The boundary-wall of the temple was plastered and the stitching of vertical crack on the left side wall of the main entrance was attended to. Lightning conductor was provided to this temple.

143. JALESVARA TEMPLE, KALNA, DISTRICT BARDHAMAN

Twisted wire fencing was tightened and wherever found necessary, the lost and damaged angle iron posts were replaced.

144. KRISHNACHANDRAJI TEMPLE, KALNA, DISTRICT BARDHAMAN

The outer facades of the Rama-Sita Temple, Narayana Temple and Radhaballavjew Temple in the complex were replastered. To prevent the water leakage, roofs of the Narayana Temple and Rama-Sita Temple were watertightened. Doors, windows and M.S. grill gates were provided to these monuments. Lightning conductor was fixed at Krishnachandraji Temple.

145. LALJI TEMPLE-COMPLEX, KALNA, DISTRICT BARDHAMAN

In continuation of the previous year's work {*1996-97,* p. 260), underpinning and replastering were done on the frontal and eastern boundary-walls of the complex and the left side room of the entrance gate of the Girigobardhana Temple. The damaged portions of the pillars of the *nata-mandapa,* tiers and wall surface of the miniature *sikharas* of the temple were reset and the basement of the pillars of *nata-mandapa* were replastered by removing the dead and old plasters. The damaged lime-concrete floor of the *nata-mandapa* and one of the rooms inside the complex were relaid. Lightning conductor was fixed at this temple.

146. SIVA TEMPLES, KALNA, DISTRICT BARDHAMAN

After removing and cleaning of mud and vegetational growth from the inner courtyard of temple-complex, the lime-concrete floor was relaid. Old, damaged doors were repaired and refixed and were given a fresh coat of painting. The work of retouching of the decorative designs of the interior walls of the temples was taken up. The work is under progress.

147. METCALFE HALL, CALCUTTA

In continuation of the previous year's work (*1996-97,* p. 263), repairing and restoration of the capitals of pillars on the western side of the monument were done wherever found necessary. Beams, brick works were replaced and ornamental plastering work was retouched. Lime-concrete was laid over a layer of burnt clay tiles by replacing damaged ones. Walls were replastered after repairing the doors and windows by changing/ replacing damaged components. The same were repainted as per the original. Old water supply system of the monument was revived and necessary arrangement for electric connection and wiring in different parts of the building were made.

148. Victoria Memorial Hall, Calcutta (Under Civil Deposit Work)

The dome at northwestern corner of the roof was repaired by sealing of cracks and resurfacing with traditional *Mme-surkhi* mortar, after removing the layers of rotten tarphelt, over the layer of ferro-concrete. Replastering work was carried out on the parapet-walls in composite mortar. The colonnades were repaired by taking out the damaged parts and resetting them in appropriate manner. Pointing in composite lime-mortar was done on the marble joints of exterior walls after raking out the dead mortar. The damaged marble floor of the western courtyard was repaired by replacing the damaged slabs with new ones by providing lime-concrete cushion. Barbed-wire fencing around the compound was repaired. Chequered tiles were laid on the footpath inside the enclosed area of the complex along with the spreading of gravels on the pathways. Rain-water pipes of the building were cleaned to facilitate easy flushing of water.

149. Cooch Behar Palace, Cooch Behar, District Cooch Behar

Exterior and interior walls of the palace was made moss and lichen free. Vegetational growth from the monument was removed. The open drains outside the palace were cleaned by flushing out accumulated water. Fixing of barbed-wire fencing around the protected area of the monuments was completed. Durbar Hall of the palace was partly repaired by replastering of the walls at various heights after scraping the thick layer of lime coating and decayed plaster. Damaged and missing ceilings of a few rooms were replaced by providing new ones to match the original. Lime washing was done inside the Durbar Hall, adjoining rooms, the walls and arches of the verandah. Distempering work in some rooms of the palace was done after replastering of walls by plaster of paris. Repairing and painting of doors of some rooms were done and the glasses were fixed at the door and window panels. Face lifting of the frontal facade of the palace has been started and the work is in progress.

150. Dupleix Palace, Chandannagar, District Hooghly (Under Civil Deposit Work)

The parapet-wall of the auditorium building was restored. Anti-corrosive painting was done at the R.S. Joist of the roof. To protect the plinth the auditorium building was provided with a protective brick apron around it and terrazo flooring work was carried out.

151. Ditch Memorial Monument of Susanna Anna Maria, Chinsurah, District Hooghly

Plastering work was done on the required places of the monument. M.S. grill was provided at the entrance of the newly constructed boundary-wall.

152. Minar, Pandija, District Hooghly

After scraping out the worn, pulverised plaster of the outer wall and damaged worn-out concrete from the first stepped-projected roof of the minar decorative replastering was done on the former and lime-concrete was relaid on the latter. Lightning conductor was fixed on the monument to prevent it from lightning strikes.

153. Brindaban Chandra Thakur's Matha, Guptipara, District Hooghly

The damaged frontal pillars of Gaur-Netai Temple of the complex were restored as per the original. The out-of-plumb wall on the northern side of the temple was brought to its original position by dismantling and resetting the bricks. The damaged portions of the roof were dismantled and additional support was removed to carry out the necessary repair work. The work is in progress. Lightning conductor was fixed in the Krishna Chandra Temple (pls. 187-188).

154. Tomb and Mosque, Satgaon, District Hooghly

In continuation of the previous year's work *(1996-97,* p. 264), underpinning brickwork on the damaged portion of the mosque was undertaken and completed. Pathway within the complex was laid. Straining and stretching of twisted wire and barbed wire on the boundary-wall, after fixing angle iron posts were taken up and completed.

155. Danish Cemetery, Serampore, District Hooghly

Repairing and replastering work on the damaged tombs of the cemetery was completed.

156. Dargah of Zafar Khan Gazi, Tribem, District Hooghly

To prevent thoroughfare inside the complex, boundary-wall on the three sides of the protected area (except on the southern side) was taken up for construction. The work is in its preliminary stage.

157. Adina Mosque, Pandua, District Malda

For the beautification of the premises, scattered architectural stone members were collected and stacked in one place. Lime-concrete pathway extending from the main gate to the staff-quarters was relaid. Fresh layer of *murum* was given on the existing apron along the outer periphery of the walls. Above the wooden door, broken portion of the wall was restored. Petty patches were repaired by underpinning, pointing, etc. The monument and its premises were made free of vegetational growth. Repairing of missing barbed-wire fencing was attended to (pls. 189-190).

158. Ekalakhi Mausoleum, Pandua, District Malda

Clearance of vegetation was done from the monument and its adjoining premises. Fresh *murum* was spread over the approach road to the monument.

159. Qutbsahi Masjid, Pandua, District Malda

Clearance of vegetation was done in the monument and its adjoining premises.

160. John Pierce's Tomb, Midnapore, District Midnapore

Vegetational growth in the monument and its premises was removed.

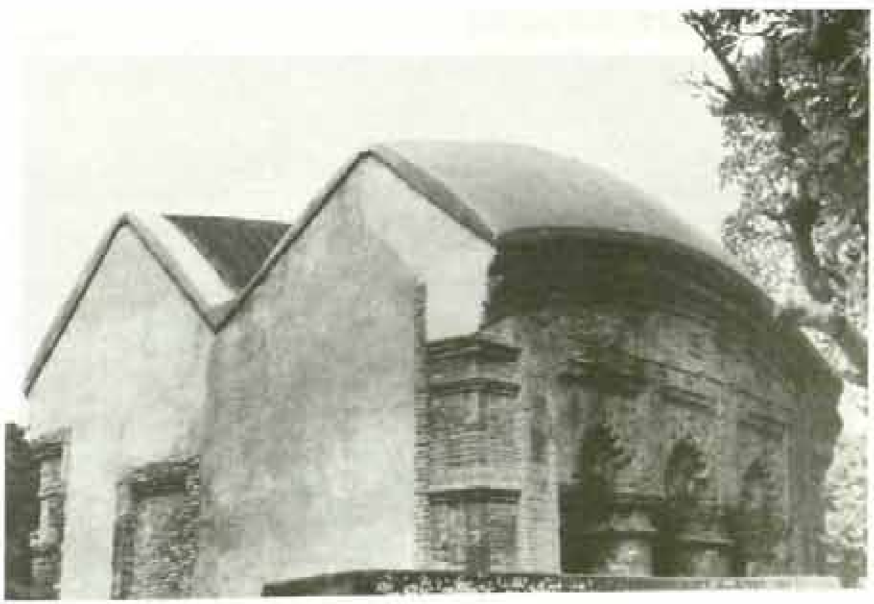
161. Charbangla Group of Temples and Bhabanisvara Temple, Baranagar, District Murshidabad

Lightning conductors were fixed on the temples to avoid damage by lightning. Clearance of vegetation from the monument and its premises was attended to.

PLATES 187-188



187



188

Brindavan Chandra Thakur's Matha, Guptipara, Gaur-Netai Temple : 187, *before and* 188, *after conservation*

PLATES 189-190



189



190

Adina Mosque, Pandua, portion of wall : 189, *before and* 190, *after conservation*

Interior walls of Bhabanisvara Temple were whitewashed.

162. Mosque, Kheraul, District Murshidabad

Clearance of vegetation from the monument and its premises was attended to. Barbed-wire fencing around the monument was repaired and strengthened. Wherever found necessary, the missing angle iron posts were provided in cement-concrete base. Angle iron posts were painted to give protection against corrosion. The damaged portion of the mosque was repaired and wherever found necessary; underpinning was done in appropriate combination mortar.

163. Tomb and Mosque of Alivardi Khan and Sirajuddaullah, Khosbag, District Murshidabad

Lightning conductor has been fixed on the mosque in the complex.

164. Hazarduari Palace-Complex, Murshidabad, District Murshidabad

The old and worn-out pathway was relaid after dismantling the old one. New barbed-wire fencing was provided at places where it was found missing. The loose barbed-wire was refixed after proper stretching. The angle iron posts were repainted wherever found necessary. Square iron nets were fixed along the fencing for developing garden in the complex.

The old, damaged and worn-out lime-concrete over the dome of Medina and turret of Clock Tower was removed and new cement-concrete pathway was provided around the Medina after dismantling the old decayed pathway. After raking out the old pulverised plaster from the walls of the Medina and Clock Tower, replastering was done. Colour washing was done on the exterior and interior walls of the Medina and Clock Tower. Lightning conductor was fixed on the Clock Tower. On the side of the pathway around the Medina, brick edging has been carried out. The old, damaged *burgahs* of the Medina were replaced by the new ones. The doors, windows, grill-gate etc. of this portion were repainted.

165. Imambara, Murshidabad, District Murshidabad

After removing the old damaged lime-concrete from the northern part of the roof, fresh lime-concrete was provided. Replastering was done with composite mortar after raking out the old damaged plaster of the parapet-walls. The damaged coping of the parapet wall was thoroughly repaired. Old damaged wooden *burgahs* were replaced by the new ones.

166. Katra Mosque, Sabjikatra, District Murshidabad

Vegetational growth was cleared from the monument-complex. Fresh lime-concrete pathway was provided after removing the old and damaged pathway. Old and damaged lime-concrete of the dome was removed and relaid by fresh lime-concrete. Lightning conductor was fixed on the monument as a safety measure.

167. Palpara Temple, Chakdah, District Nadia

Underpinning brickwork on the damaged outer facades of the wall, recess pointing on the outer and

inner facades of the temple and pointing work on the entrance gate of the temple were undertaken.

168. Excavated Remains of Bangarh, Gangarampur, District South Dinajpur

Clearance of vegetation from the exposed structures and its adjoining area was done.

SIKKIM

169. Dubdi Monastery, Kheochad Phalri (Yoksum), District West Sikkim

In continuation of the previous year's work (7996-97, p. 269), bulged-out walls and the damaged floor of the monastery were repaired as per the original by dismantling and resetting the architectural members. The plaster containing murals on the inner walls of the monastery were carefully preserved. With necessary plinth protection, the foundation of the monastery was strengthened and stabilised and apron on all the four sides of the monastic building was provided. The roof of the monastery was repaired by replacing damaged sheets and the same was repainted to match the original. The *chhajjas* and string courses all along the outer walls were repaired and restored.

Chandigarh Circle

HARYANA

170. Ancient Stupa at Agroha, District Hissar

Restoration of ancient excavated stupa with Kushan bricks as per original and flooring with Kushan bricks was completed including pointing the same.

171. Ancient Site at Banawali, District Hissar

Digging out of filled trenches with extreme care has been completed bit by bit. The work of scientific conservation of ancient excavated structures, mud-tile brick masonry, providing and fixing of translucent sheet very carefully on R.S. Joists and angle iron channel over excavated trench has been completed.

172. Ancient Brick Temple, Kalayat, District Kaithal

The decayed brick masonry of the foundation was taken up and after laying cement-concrete, lead sheets were inserted to check the capillary rise of water. Foundation was stabilised after digging 4.20 m deep and 1.50 m wide by *lakhauri* brick masonry around the temple. The temple was brought to the original level and flooring around the temple was restored with tiles/ *lakhauri* bricks giving proper slope to drain the rain-water.

173. Kabuli Bagh Mosque, Panipath, District Panipath

Decayed and peeled portion of heavy and engraved red sandstones was replaced with new ones as per the original. Underpinning and watertightening of the fortification wall including pointing work of brick masonry was completed. The repair work of dome was taken up by removing decayed plaster from inside and outside and replastering work attended to by reproducing geometrical designs and mouldings in plaster as per original. The laying of red sandstone flooring of the courtyard has been completed. The restoration of the cells and inner courtyard has also been taken up and completed.

174. Shahjahan Ki Baoli, Meham, District Rohtak

The side walls of the *baoli,* which had collapsed due to floods in the area were taken up for restoration. The work of giving support by gunny bags filled with sand to prevent falling of the structure was completed. Further work is in progress.

HIMACHAL PRADESH

175. Laxmi Narayana Temple, Chamba, District Chamba

Decayed and damaged flag-stone flooring in the temple-complex was removed and new flag-stone matching in colour and texture were laid as per original pattern maintaining archaeological norms and principle.

176. Fort, Nurpur, District Kangra

Restoration and reproduction of coursed rubble stone masonry in composite mortar and pointing the same in lime-*surkhi* mortar including flag-stone flooring was done as per original pattern and design.

177. Buddhist Monasteries, Tabo, District Lahaul and Spiti

The work of restoration of*chokhtins* with R.R. stone masonry in lime-cement mortar and mud brick masonry in mud mortar was undertaken. Removal of the damaged and decayed mud plaster, 60 mm thick as per original and insertion of lead sheet in a small patch in the perimeter wall of Longchibo was also done. Restoration of R.R. stone masonry of the retaining wall of Phoo Gumpha near pathway with lime-cement mortar as per original was completed.

178. Mirkula Devi Temple, Udaipur, District Lahaul and Spiti

Temporary measures have been taken to prevent the water from percolating through the roof. Further work is under progress.

PUNJAB

179. Takht-i-Akbari, Kalanaur, District Batala

Dismantling of sunken and decayed loose masonry and restoration of the same has been undertaken. Concreting, pointing, dismantling of pulverised plaster has been taken up and is in progress.

180. Bhatinda Fort, Bhatinda, District Bhatinda

The work of dismantling loose, decayed and fallen portion of the bastion and restoration of the core including attending to the mud brick masonry work and laying concrete in layers, undermatching with *lakhauri*/tile masonry and watertightening of terrace has been completed as per original.

181. Dakhni Sarai, Dakhni, District Jalandhar

The damaged portion of the cells of the *sarai* was taken up for restoration. The missing portions were reproduced. The sunken and pulverised flooring of the cells were repaired by relaying lime-cement-concrete.

182. Mughal Bridge, Jahangir, District Jalandhar

The cracks that had developed on the side walls of bridge were filled up and pulverised portion of the masonry was removed and repaired. The work on the remaining portion is in progress.

183. Noormahal Sarai, Noormahal, District Jalandhar

The work of laying of concrete, restoration and reproduction of *lakhauri/*tile brick masonry including pointing and watertightening the roof of the mosque has been completed as per original pattern.

184. Ancient Site and Nalagarh Kothi, Ropar, District Rupnagar

The excavated ancient Harappan and Kushan structures were conserved as per original by using similar material. The structure over mound called Nalagarh Kothi was restored by underpinning in *lakhauri* brick masonry and watertightening and brick flooring was completed. Restoration and reproduction of *lakhauri/tile* brick masonry, pointing, concreting tile brick flooring has been taken up. The work of providing barbed-wire fencing around the mound was also completed.

Chennai Circle

TAMILNADU

185. Officers' Mess (Block No. XXXVI/2), Fort St. George, District Chennai

The old and weathered plastering of the leaky terrace of this building (now housing the Fort Museum) was removed and it was properly watertightened by using combination mortar with waterproofing compounds. The decayed wooden joists in Gallery Nos. 8 and 9 were carefully removed and replaced with new ones. The damaged wooden frames, shutters of the windows and doors and sunshades were removed and replaced with new ones wherever necessary.

186. Nitisvarasvamy Temple, Srimushnam, District Cuddalore

The weathered portions of the main Vimana were strengthened by underpinning after the removal of dead mortar, filleting the joints and finally plastering of specially prepared lime-mortar. The broken and weathered stucco figures were mended as per the clues available.

187. Sugrisvara Temple, Sircar Periyapalayam, District Erode

The old and weathered course of the leaky terraces of the sub-shrines were carefully removed and properly watertightened by laying a fresh course of brick jelly with combination lime-mortar. Earth work excavation around the main and sub-shrines was carried out to expose *adhishthana* mouldings. The protected area was fenced with barbed-wire.

188. Vaikunthaperumal Temple, Kanchipuram, District Kanchipuram

The leaky Vimana of the main shrine and Amman shrine were properly watertightened by applying specially prepared lime-mortar after removal of old and dead mortar. The broken stucco figures of the Vimana were mended as per original. The damaged plastering on the inner walls of *garbhagriha* of the main shrine was removed and replastered. The damaged flooring of the functional *talas* of main Vimana was raked out and newly laid

189. Ruined Dutch Fort and Cemetery, Sadras, District Kanchipuram

The ruined fortification wall on the southern side was reconstructed with the use of special bricks (matching the original) with combination lime-mortar as per the clues available. The cracks on the ceiling of the granary were properly grouted to match with the original. The damaged bell tower was conserved properly (pis. 191-192) after removal of additional terrace. The original archway was also restored.

190. Apatsahayesvara Temple, Tenneri, District Kanchipuram

The moss and lichen which had covered the Vimana were cleaned chemically. The leaky Vimana was watertightened properly after removal of old and weathered plastering. The undulated stone flooring in the *garbhagriha* was relaid. The damaged false ceiling in the *garbhagriha* was removed and replaced by a new one using wooden planks and joints. The encrustation such as oil, lamp black, etc., found in *garbhagriha* was removed by applying diluted liquid chemicals.

191. Tirupulisvara Temple, Vayalur, District Kanchipuram

The dilapidated *madapalli,* built with brick was completely dismantled and reconstructed as per original after laying suitable foundation.

192. Brihadisvara Temple, Gangaikonda Cholapuram, District Perambalur

The weathered stucco ornamentation over the colossal stucco *nandi* was completely removed and remodelled as per the old clues. The missing stucco portions were carefully mended using hand ground lime-mortar. A thin coat of plastering with fine lime-mortar was applied after strengthening the base to match with the original. The accumulated earth on the southern side of the *mahadvara* and all along the southern Tirumadil *(prakara)* was removed to restore the original ground level, so as to avoid water stagnation during rain.

193. Siva Temple, Ariyur, District Pudukkottai

The dilapidated Amman shrine, pillared *mukha-mandapa* of the main shrine and *prakara* wall were completely dismantled and reconstructed with the use of *surkhi-concrete* and pressed tiles. The missing *chhajja* portions of *madapalli* have also been provided with new ones. The work of reconstruction of the structures is in progress.

194. Siva Temple and Lion Pillars, Irumbanadu, District Pudukkottai

The apsidal temple which was in a dilapidated condition and completely settled due to water seepage was completely dismantled after proper documentation. It was reconstructed as per original after laying a suitable foundation.

195. Sikhanathasvamy Temple, Kudimiyanmalai, District Pudukkottai

The leaky *raja gopura* was watertightened after removal of weathered plastering. The tiers were strengthened by underpinning and filleting the joints. The damaged architectural members in the tiers were mended as per the clues available. The weathered

PLATES 191-192



191



192

Ruined Dutch Fort and Cemetery, bell tower : 191, *before and* 192, *after conservation*

plastering over the stucco figures was removed and replastered with fine lime-mortar to match the original.

196. VALARMADISVARA TEMPLE, NIRPALANI, DISTRICT PUDUKKOTTAI

The dilapidated *maha-mandapa* and pillared *mukha-mandapa* of the main shrine, Amman shrine, Bhairava shrine and *madapalli* were completely dismantled and reconstructed as per the original after laying proper foundation. The work of relaying undulated stone floorings, restoration of original level to the front *gopura* by earth work excavation and construction of retaining wall were also carried out.

197. NARASIMHASVAMY TEMPLE, NAMAKKAL, DISTRICT SALEM

The undulated stone flooring in the *maha-mandapa* of this temple was relaid over concrete by using new stones wherever necessary.

198. AIRAVATESVARA TEMPLE, DARASURAM, DISTRICT THANJAVUR

To develop garden around the monument the entire temple-complex was fenced with RCC posts.

199. BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR

The old and weathered plastering on the walls of the *garbhagriha,* main shrine, Karuvurar shrine, *madapalli* and the Maratha arch were completely removed and replastered with combination mortar. The weathered stucco figures were strengthened by applying hand ground lime-mortar. The damaged brick flooring in front of main shrine, Amman shrine and courtyard on both the sides of the main shrine, were removed and relaid with special bricks over the base of two layers of brick jelly concrete and lime-mortar. The accumulated earth in the area between Keralantaka *gopura* and Rajaraja *gopura* was removed and a thin layer of gravel has been laid. The sub-shrines were provided with ceilings of*1luppai* wood to avoid nuisance of bats.

200. ERUMBESVARA TEMPLE, TIRUVERUMBUR, DISTRICT TIRICHCHIRAPPALLI

The old and weathered plastering of the leaky Vimana and *gopura* were removed and properly watertightened by underpinning and filletting the joints and finally plastering by specially prepared lime-mortar. The broken stucco figures of the Vimana and *gopura* were mended with the clues available. Similarly the broken stucco figures of *nandi* over the coping of *tirumadil (prakara)* were also mended and strengthened after removal of thick vegetation. The old, out-of-plumb *nandi-mandapa* was completely dismantled and reconstructed as per the original, using new pillars wherever necessary. The *pradakshinapatha* and area near the entrance *gopura* have been laid with stone flooring over concrete base. The accumulated earth and debris around the temple was removed and the original drainage outlet was exposed.

201. KAILASANATHA TEMPLE, VELLANUR, DISTRICT PUDIKKOTTAI

The dilapidated temple was completely dismantled and reconstructed as per original. The entire temple-complex was fenced with barbed-wire (pls. 193-194).

PLATES 193-194



193



194

Kailasanatha Temple, Vellanur : 193, *before and* 194, *after conservation*

202. Fort, Vellore, District Vellore

The breached and out-of-plumb moat wall to a length of 230 m on northwestern side was completely dismantled and reconstructed with available stones as per the original after providing proper foundation. The rear side of the moat wall was consolidated with small boulders.

203. Jalakantesvara Temple, Vellore, District Vellore

The moss and lichen covering the outer and inner *gopuras* were chemically cleaned. The outer surfaces of the *gopuras* were toned up with lime-paste. The *nandi* over the inner *tirumadil* were mended properly and colour washed.

204. Patalesvara Temple, Brahmadesam, District Villupuram

The fallen and disintegrated outer veneer of the *pada* portions on the northern side of the recently protected temple was completely dismantled and rebuilt after removing thick vegetation and filling up the core with fresh cement-mortar. Reconstruction work is in progress.

205. Fort, Gingee, District Villupuram

The fallen fort wall and out-of-plumb bastions on north-east and south-west corners were dismantled and rebuilt as per original feature. The buttress-wall supporting the arches and pillars were removed to restore originality to the monument. The weathered plastering on the ceiling of the cells and corridors was removed and replastered with specially prepared lime mortar. The accumulated earth and debris in and around the royal harem was removed carefully and original flooring, drains, etc., were exposed.

206. Saad-at-ullah Khan's Mosque, Fort Gingee, District Villupuram

A wide crack at the centre of the roof of the mosque to a length of 18 m was grouted after underpinning the cracked portion with special bricks. The weathered plastering of the roof was completely removed and relaid with two layers of flat tiles. The weathered arch typed ceilings of the mosque were also removed and replastered with specially prepared lime-mortar to match with the original.

207. Pattabhirama Temple, Narasingarayanpettai, District Villupuram

The weathered plastering of the *gopura* was removed and strengthened by underpinning and filletting the joints. The broken stucco figures were mended using specially prepared lime-mortar. The missing stucco figures were reconstructed as per the clues available. The moss and lichen covering the damaged *gopura* was removed by chemical cleaning. The missing *kalasas of the gopura* were replaced by new ones. Colour washing was carried out to the Vimanas of main shrine and sub-shrine and *gopura* to match with the original.

PONDICHERRY

208. Sri Varadaraja Perumal Temple Tribhuvanai, District Pondicherry

The dilapidated *vahana-mandapa* of this temple was completely dismantled and reconstructed. The terrace was provided with RCC

roof and laying of fresh brick jelly concrete with lime concealed by two courses of flat tiles and plastered in combination mortar. The undulated stone flooring was completely dismantled and relaid over the concrete base.

DELHI CIRCLE

DELHI

209. ADHAM KHAN'S TOMB, NEW DELHI

Structural repairs by way of underpinning, pointing of joints and lime-concrete flooring were attended to.

210. ASOKAN ROCK EDICT , NEW DELHI

The area around the monument was fenced with random rubble masonry wall and MS railing to stop misuse and encroachment.

211. BEGUMPURI MASJID, NEW DELHI

Structural repairs by way of pointing, stitching of cracks in composite mortar and plastering were undertaken.

212. BIJAY MANDAL, NEW DELHI

The cracks in random rubble masonry were grouted. The works of underpinning and pointing of the joints were also completed.

213. DELHI GATE. DELHI

The structural repairs comprising pointing of open joints and plastering was carried out apart from providing concrete flooring and mild steel railing all around the monument.

214. HUMAYUN'S TOMB-COMPLEX, NEW DELHI

The damaged red sandstone *jalis* were replaced with the new ones, as per the original. Pointing of the joints was carried out to strengthen the enclosure walls. Lime-concrete flooring and red sandstone paved flooring was provided on the main pathway from western gateway to booking office at the outer entrance gateway.

215. JAMALI-KAMALI TOMB AND MOSQUE, NEW DELHI

Concrete floor was laid as per the original. Pointing of joints and underpinning in random rubble masonry were also carried out to strengthen the monuments.

216. KHAIRUL-MANAZIL MOSQUE, NEW DELHI

Underpinning with random rubble masonry, pointing of the open joints and plastering in composite mortar were completed.

217. PURANA QILA, NEW DELHI

Lime-concrete floor was laid in the cells of the fortification wall besides underpinning the voids, pointing of the joints and plastering.

218. QUTB MINAR, NEW DELHI

The decayed sandstone veneering stones, and rubble stones of the core were replaced with new red and buff sandstone blocks in conformity with the original. The core masonry was strengthened by grouting the cracks.

The Qutb Archaeological Area including parking space was properly fenced by providing and fixing

MS railing over low random rubble wall to check encroachments.

219. RAJON-KI- BAIN, NEW DELHI

The stepped-well was partly desilted besides providing ashlar stone masonry in appropriate mortar. The damaged walls were repaired by underpinning in random rubble masonry and pointing of the open joints.

220. RED FORT, DELHI

The work of laying lime-concrete floor at Hammam was completed. Besides, lime-plastering and providing terrace concrete at Diwan-i-Am, the damaged and missing red sandstone *jalis* were restored as per the original.

221. SAFDARJUNG TOMB, NEW DELHI

Lime-concrete floor was laid at Jangli Mahal. Pointing of the joints and underpinning were the other items of work attended to at the cells of the enclosure-wall. The terrace of the southern building was re-laid with lime-concrete floor to stop water seepage.

222. SHER SHAH GATE, NEW DELHI

Underpinning with random rubble masonry, pointing of the open joints and patch plastering in composite mortar were carried out.

223. SHEESH MAHAL, NEW DELHI

The damaged and missing portions of red sandstone pillars were replaced, as per the original. Besides, strengthening of the walls by way of underpinning, pointing of joints and plastering with composite mortar, were also undertaken.

224. TUGHLAQABAD FORT, DELHI

The repairs to the damaged portion of the fortification wall and bastions of the Tughluqabad fort were undertaken by restoring the fallen ashlar and RR stone masonry, as per the original, besides stitching and pointing of the joints. The core masonry was also strengthened by grouting the cracks.

225. ZAFAR MAHAL, NEW DELHI

The structure was strengthened by way of random rubble and brick masonry along with pointing of the joints. Lime-concrete was laid at the terrace.

226. ZAUQ-KI-MAZAR, DELHI

The construction of the compound-wall in random rubble masonry is in progress.

GUWAHATI CIRCLE

ASSAM

227. CACHARI RUINS, KHASPUR, DISTRICT CACHAR

Decorative works have been restored. Missing bricks were underpinned. Compound-wall has been repaired. Pointing has been attended to. Approach pathway has been provided.

228. IDGAH, RANGAMATI HILL, DISTRICT DHUBRI

Barbed-wire fencing has been provided. Repairing works have been undertaken. A low height retaining wall has been provided to the prayer ground and earth filling work has been done in low areas.

229. PANBARI MOSQUE, RANGAMATI HILL, DISTRICT DHUBRI

The decayed lime-concrete in the dome No. 3 has been replaced Cornices have been restored. Iron shutters have been provided. Brick pathway has been made and other necessary repairing works have been attended to.

230. SRI SURYAPAHAR RUINS, DISTRICT GOALPARA

Stone paving around the stupas and sculpture has been provided. Approach pathway has been improved. Fencing has been repaired.

231. SIVA TEMPLE, NEGHERITING, DISTRICT GOLAGHAT

In continuation of the previous year's work *(1996-97,* p. 279), plastering and lime-concrete work in the temple has been undertaken. Bricks on the edge pathway have been provided.

232. GA.NESA TEMPLE, KAMAKHYA, DISTRICT KAMRUP

Repairing work of the stone gateway has been attended to. Earth cutting has been done wherever necessary. The Narakasur sculpture has been restored to its original position. The stone-paved pathway has been improved.

233. DEVIDOL, GAURISAGAR, DISTRICT SIBSAGAR

Repairing work of the compound-wall was undertaken.

234. GAURISAGAR TANK, DISTRICT SIBSAGAR

Outlets to the tank have been provided in order to prevent breach of embankment due to overflow of water in the rainy season. Repairing work of the existing embankment was also attended to.

235. GHANASHYAM HOUSE, JOYSAGAR, DISTRICT SIBSAGAR

Earth filling has been done in low areas of the compound. Drain pipes have been provided to drain out the surface water from the monuments.

236. GROUP OF FOUR MAIDAMS, CHARAIDEO, DISTRICT SIBSAGAR

Brick pathway has been provided for access to the maidams. Repairing work of the brick structure over the maidams has been attended to. Missing bricks have been underpinned. Pointing and fence repairings have been undertaken.

237. KARENGGHAR PALACE, JOYSAGAR, DISTRICT SIBSAGAR

In continuation of the previous year's work *(1996-97,* p. 279), lime-concrete has been done in the open terrace. Pointing, plastering, brick works and plinth protection measures have been taken.

238. RANGHAR PAVILLION, JOYSAGAR, DISTRICT SIBSAGAR

In continuation of the previous year's work *(1996-97,* p. 279), renewal of lime-concrete has been undertaken. Decorative works and plastering of the damaged portions have been attended to. Fence repairing and grill fixing etc. on the first floor has been done.

239. SIBDOL, SIBSAGAR, DISTRICT SIBSAGAR

In continuation of the previous year's work *(1996-97,* p. 280), decayed lime-plaster of the *mukha-mandapa* has been removed and repaired. Damaged brick pavements have been repaired.

240. VISHNUDOL, JOYSAGAR, DISTRICT SIBSAGAR

Pathway has been laid with bricks. Turn style gate has been provided. Patch plastering and pointing works have been attended to.

241. VISHNUDOL, SIBSAGAR, DISTRICT SIBSAGAR

In continuation of the previous year's work (*1996-97,* p. 280), lime-concrete of the *mukha-mandapa* has been removed and repaired. Patch plastering of the main temple have been attended to.

242. BORDOL TEMPLE, BISHVANATHGHAT, DISTRICT TEZPUR

In continuation of the previous year's work (*1996-97,* p. 280), clearance of vegetation over the temple was undertaken. Plastering work on the outer side has been done. Pointing and lime-concreting have been attended to.

243. MOUND AND RUINS OF THE STONE TEMPLE, DAH PARBATIYA, DISTRICT TEZPUR

Missing bricks of the temple walls have been replaced. Lime-concreting, pointing and earth filling have been undertaken.

MEGHALAYA

244. DAVID SCOTT'S, CHERRAPUNJI, DISTRICT EAST KHASI HILLS

Besides providing barbed-wire fencing, resetting of stone pathway has been done and other necessary repairing works have been attended to.

245. FORT, DIMAPUR, DISTRICT KOHIMA

The exposed brick wall adjacent to the main gate has been restored. Pathway has been repaired. Stone paving around the monoliths, within the fort, has been provided.

TRIPURA

246. BHUBANESVARI TEMPLE, UDAIPLR, DISTRICT SOUTH TRIPURA

The work of patch plastering and lime-concreting has been attended to. Iron door and brick on the edge pathway have been provided.

247. CHATURDASA DEVATA TEMPLE, UDAIPUR, DISTRICT SOUTH TRIPURA

Compound-wall has been repaired. Plastering, lime-concreting and brick paving in the apron have been undertaken. Repairs to the entry gate have been done.

248. GROUP OF TEMPLES, GUNAVATI, UDAIPUR, DISTRICT SOUTH TRIPURA

Patch plastering work, missing brick work, pointing, lime-concreting and plinth protection measures have been undertaken.

HYDERABAD CIRCLE

ANDHRA PRADESH

249. SHRI VEERABHADRASVAMY TEMPLE, LEPAKSHI, DISTRICT ANANTPUR

The old, decayed lime-concrete of the leaky roof of the cloister *mandapa* on the eastern side was removed and its borken and disturbed roof slabs and

beams were dismantled. The reconstruction of the *mandapa* with the available original stone members and also by providing new beams and slabs wherever necessary is in progress.

250. RAYADURG FORT, RAYADURG, DISTRICT ANANTAPUR

The reconsruction work of the collapsed portions of the fort walls at the second and third entrances has been taken up. The collapsed portions of the fort wall were rebuilt as per the original by using the same cyclopean stones available in the debris. The collapsed *mandapa* adjancent to the gateways has also been reset.

251. EASTERN GOPURA OF SHRI CHINTALARAYASVAMY TEMPLE, TADIPATRI, DISTRICT GUNTUR

Major structural repairs to the damaged brick *gopura*—like consolidating the hanging brick masonry, replacement of decayed wooden members with new ones treated with anti-termite paint and plastering the interiors have been completed.

252. FALLEN BREACHES OF INNER FORT NEAR RAJA MAHAL, CHANDRAGIRI, DISTRICT CHITTOOR

The works of reconstruction of remaining fallen breaches of inner fort wall with available stones as per the original and the top of the inner fort wall including the reconstructed portions was watertightened and the work was completed in all respects.

253.STRUCTURES INSIDE GURRAMKONDA FORT, GLRRAMKONDA, DISTRICT CHITTOOR

The damaged members of the flight of steps at Rangin Mahal were removed and replaced with newly dressed slabs. The damaged doors, windows and other wooden members in the ground floor of the Rangin Mahal were repaired and also replaced with new ones wherever necessary. The dead lime-plaster in certain areas over the walls of Rangin Mahal was removed and replastered as per the original including the damaged flooring.

254. STRUCTURES INSIDE GANDIKOTA FORT, GANDIKOTA, DISTRICT CUDDAPAH

The sunken and cracked portion of the arched inner cloister cells of the *sarai* inside the mosque was dismantled and the same was reconstructed after strengthening the foundation. The work of relaying the lime-concrete over the roof is in progress.

256. SRI SAUMYANATHASVAMY TEMPLE, NANDALUR, DISTRICT CUDDAPAH

After proper documentation, the collapsed portions *of the prakara* wall at its northeastern corner was dismantled and the same was rebuilt as per the existing pattern by using available stones and stones of similar granite texture wherever missing. Also the brick core of the wall was strengthened.

257. FORT, SIDDAVATTAM, DISTRICT CUDDAPAH

A bore well was dug inside the fort to provide drinking water to the public as also augmentation of a garden.

258. EASTERN GOPURA OF SRI KODANDARAMASVAMY TEMPLE, VO.NTIMITTA, DISTRICT CUDDAPAH

The decayed and dead lime-plaster over the entire brick *gopura* was removed carefully. The loose

and hanging brick masonry of the top *talas of gopura* was strengthened by underpinning and pointing. The work of replastering and mending of stucco figures, *kudus,* plasters and ornamental designs of the *gopura* by using specially moulded bricks is in progress.

259. Sri Bhimesvarasvamy Temple, Draksharama, District East Godavari

The decayed lime-plaster over the stone masonry and brick *sikhara* of the western *gopura* was removed and the work of underpinning, pointing and applying base coat of plastering to the brick *gopura* is in progress.

260. Mahastupa, Amaravati, District Guntur

For improving the environs and security of the monument, the area around the Mahastupa was provided with fencing by constructing a low level (dwarf) C.R.masonry wall supporting 'L' angle iron posts with barbed-wire and diamond mesh frames.

261. Sri Bhavanarayanasvamy Temple, Baptala, District Guntur

The decayed lime-plaster over the brick *sikhara* was removed and replastered as per the original.

262. Buddhist Stupa, Bhattiprolu, District Guntur

The existing damaged barbed-wire fencing was removed and a new fencing was provided around the protected area by constructing a dwarf stone masonry wall fixed with 'L' angle iron posts and barbed-wire.

263. African Body Guard Rooms, Golkonda Fort, District Hyderabad

The decayed lime-plaster on the exterior of the northern and southern African body guard rooms were removed and replastered with fresh lime-plaster. The works of pointing the stone masonry joints and plastering of the flooring of the northern and southern body guard rooms, restoration of stucco work in the ceilings and the work of fixing M.S. iron grill gates to the arched opening were completed.

264. Darbar Hall, Golkonda Fort, District Hyderabad

The works of replastering the damaged floor in the upper terrace of the Darbar hall; removal of decayed lime-plaster and replastering the wall in the first floor and at the ground floor of Darbar hall; repointing of the external side of stone masonry walls of Darbar hall; plastering of staircases, grouting of deep holes, removal and reconstruction of leaning and cracked west side arch in the first floor etc., have been completed.

265. Fort, Golkonda, District Hyderabad

Water tanks are being provided at different levels from the bottom to the summit inside Golkonda Fort to provide drinking water to the visiting tourists.

266. Fort, Golkonda, District Hyderabad

The damaged iron fencing in the open area in front of the main gate of Balahissar was removed and new stone masonry wall is being built to fix newly designed iron grill over it, to stop illegal entry of the people and also to improve the environs. The work is in progress.

267. Rani Mahal-Complex, Golkonda Fort, Golkonda, District Hyderabad

The missing portions of stone masonry wall on the eastern side of Rani Mahal were rebuilt and the walls on the roof were strengthened by underpinning, grouting, pointing and watertightening. The collapsed portion of inner enclosure-wall adjacent to the Rani Mahal-complex was rebuilt as per the existing pattern using available material recovered while clearing the debris here and finally its top was watertightened.

268. Fort And Gateways, Golkonda Fort, Golkonda, District Hyderabad

The rank vegetation and trees grown over the structures inside the fort and gateways were removed to give facelift to the structures. Further tree killer was applied wherever necessary to avoid further growth of vegetation.

269. Bandar Fort, Machilipatnam, District Krishna

The debris of the medieval brick walls which have collapsed was cleared and bricks were sorted out for reuse. The vegetation in the area has been cleared and top of the other walls damaged due to rain-water have been provided with a layer of concrete. The work is in progress.

270. Ancient Site, Munagacherla, District Krishna

The work of providing fencing around the ancient site using pre-cast cement-concrete posts and barbed wire was completed.

271. Akkanna Madana Caves, Vijayawada, District Krishna

The work of watertightening the top of the caves by filling the cleaned services with cement-concrete followed by plastering over it, providing pathways by laying cement-concrete and fixing of diamond mesh fencing over the existing boundary-wall on the *ghat* road to stop people throwing garbage in the protected area, was completed.

272.KONDAREDDY BURZ, KURNOOL, DISTRICT KURNOOL

The damaged M.S. grill fencing was removed and a low level stone masonry wall was built and the old grills were repaired and refixed over this wall for improving the environs and the security of the monuments.

273. Tomb of Sayed Al-huda Ma Saheba Bibi in the Complex of Abdul Wahab Khan's Tomb, Kurnool, District Kurnool

Under deposit work, the decayed lime-concrete roof of the tomb was removed and relaid with brick jelly concrete. The partly collapsed *taki*-stone parapet-wall of the tomb was reconstructed by using available stones and a few new stones. New *chhajja* stones are fixed wherever original ones were missing.

274. Sri Umamahesvarasvamy Temple, Yaganti, District Kurnool

The decayed lime-concrete over the roof of cloister *mandapa* around the *pushkarini* was removed and relayed with fresh lime-concrete and

then plastered for watertightening the leaky roof. Restoration of damaged brick structures like miniature *sikharas,* parapet-wall, brick coping and other fallen walls and stucco work over the *prakara* of *pushkarini* has been attended to by reconstructing the *prakara* of *pushkarini,* replastering and underpinning.

275. GROUP OF TEMPLES, ALAMPUR, DISTRICT MEHBOOBNAGAR

The decayed roof concrete over the Garuda Brahma and Kumara Brahma Temples was removed and the damaged roof slabs were replaced with new ones wherever necessary. Then fresh weatherproof baby jelly concrete was laid followed by plastering over it to stop ingress of rain-water. The construction of parapet-wall around the roof was also completed.

276. GROUP OF TEMPLES, SATYAVOLU, DISTRICT PRAKASAM

The damaged stone masonry enclosure-wall was removed and the construction of a new low level stone masonry wall is in progress to provide diamond mesh frames over it for fencing the protected area.

277. GROUP OF TEMPLES, MUKHALINGAM, DISTRICT SRIKAKULAM

The encroachment in the southern and western sides of the Bhimeswaraswamy Temple was cleared and the area was fenced by constructing a low level stone masonry wall fixed with 'L' angle iron posts and barbed-wire over it. For flooring inside this temple, the available stones are being dressed properly for laying them over a sand bed. This work is in progress.

278. BUDDHIST REMAINS, KOTTURU, DISTRICT VISAKHAPATNAM

The work of fencing around the protected area was completed by using pre-cast R.C.C. posts and barbed-wire besides fixing of a welded iron gate.

279. MAHASTUPA AND ADJOINING BRICK STRUCTURES ON BOJJANAKONDA, SANKARAM, DISTRICT VISAKHAPATNAM

The work of strengthening the brick platform around the Mahastupa, by using newly made bricks of ancient size wherever necessary, is in progress.

280. PRADAKSHANAPATHA OF TRIKUTESVARA SHRINE, THOUSAND PILLARED TEMPLE, HANUMAKONDA, DISTRICT WARANGAL

The ongoing work of resetting of the dismantled architectural members of the moulded platform *(pradakshinapatha)* over newly laid foundation around the Trikutesvara Shrine was taken up and completetd.

281. LEANING PRAKARA WALL IN SOUTH-WEST CORNER OF RAMAPPA TEMPLE, PALAMPF.T, DISTRICT WARANGAL

The ongoing work of reconstruction of the dismantled *prakara* wall to its plumb over the newly laid foundation was taken up. The work of fixing the stone *kanguras* which were recovered while

excavating the earth to expose the basal mouldings of stone *prakara* wall was completed.

282. Gateway of Mud Fortification, Warangal Fort, District Warangal

The wall of the *mandapas,* arches in the western gateway of the mud fortification have been strengthened by recess pointing and then watertightened by providing fresh concrete over the walls. The stone members of the basement were reset to their original position/alignment. The damaged portions of the plastered walls were replastered. The dismantling of the bulged-out portion of the outer veneering of the mud fortification to rebuild it to plumb after strengthening its mud core, is in progress.

KARNATAKA

283. Rangeen Mahal, Bidar Fort, District Bidar

The debris were cleared inside the Rangeen Mahal to expose the buried cisterns, channels and foundation. Also the lime deposits over the intricate cut-plaster work were removed.

Jaipur Circle

RAJASTHAN

284. Badshahi Haveli, Ajmer, District Ajmer

Decayed flooring of the Haveli has been dismantled and re-laid.

285. Gateway of Taragarh Hill, Ajmer, District Ajmer

Collection of materials for taking up special repair to the monument is in progress.

286. Arched Gateway and Fort-wall near Gopinath Temple, Bhangarh, District Alwar

The portions of buried structures of the Fort-wall and Gopinath Gate were exposed by removing fallen derbris. Fort-wall and arched gateway near Gopinath Temple have been restored to the original position with R.R. stone masonry.

287. Modon-ki-Haveli, Bhangarh, District Alwar

Modon-ki-Haveli has also been exposed and repaired by replacing decayed plastering, underpinning/restoring the collapsed portion of the wall (pls. 195-196).

288. Northern Side Fortification Wall near Hanuman Gate, Bhangarh, District Alwar

The work of reconstructing of the fallen portion of fortification wall in the northern side near Hanuman Gate has been taken up and work is in progress.

289. Someshvara Temple, Bhangarh, District Alwar

Pathway in R.R. stone masonry from Gopinath Gate to Someshvara Temple has been provided.

290. Southern Side Fortification Wall Near Hanuman Gate, Bhangarh, District Alwar

The work of reconstructing of the fallen portion of fortification wall on the southern side from IVth bastion to Ajmeri Gate has been taken up and work is in progress.

PLATES 195-196



195



196

Modon-ki-Haveli, Bhangarh : 195, *before and* 196, *after conservation*

291. KOTAN-KI-DEVRI NOS. 2 AND 3 AT NEELAKANTHA, DISTRICT ALWAR

Repairs to Kotan-Ki-Devri No.2 have been carried out by removing R.R. stone masonry plinth platform and reconstructing the same.

Exposing the buried structures of the platform of Kotan-ki-Devri No. 3 and similar items of work as in Kotan-ki-Devri No.2 has been carried out.

292. FORT-WALL, BHARATPUR, DISTRICT BHARATPUR

The work of underpinning of R.R. masonry wall in patch and pointing of fortification wall from Chowburja Gate to Ashtadhatu Gate has been completed.

293. PALACES, DIG, DISTRICT BHARATPUR

Repairs to the structures on the west of Singh Pol Gate has been carried out by replastering the walls, replacement of floor concrete and underpinning of walls. The work of painting of doors and windows of the Palaces has also been carried out. Giving support to the cracked and broken stone beams of Keshav Bhawan is in progress. Material for restoration of compound wall of Nursery and Kachcha Bagh is being collected.

294. FORT, BAYANA, DISTRICT BHARATPUR

Restoration of pathway from Ist Gate to IInd Gate and collection of material for the same is in progress. Restoration of lower fortification wall, dismantling of the dislodged masonry and reconstruction of the wall in R.R. masonry is in progress.

295. GHEE-KI-BAORI, CHITTAURGARH FORT, DISTRICT CHITTAURGARH

Clearance of the earth at the steps/base and vegetation on all the sides of the *baori* was taken up.

296. GOMUKH KUND, CHITTAURGARH FORT, DISTRICT CHITTAURGARH

The pathways have been provided with paved stone flooring from Sati Gate to Gomukh Kund and from Samidheshvara Temple to Gomukh.

297. VIJAYA STAMBHA, CHITTAURGARH FORT, DISTRICT CHITTAURGARH

R.R. stone masonry wall around the parking area near Vijaya Stambha was restored and M.S.grill railing over dwarf wall along the road adjoining to Vijaya Stambha was provided.

298. MAHANAL TEMPLE AND MATH, MENAL, DISTRICT CHITTAURGARH

M.S. grill railing was provided to the waterfall for safety of visitors. The work of providing dry masonry wall along the pathway leading to the main gate is in progress.

299. BAORI, ABANERI, DISTRICT DAUSA

Outer wall of the baori-complex has been underpinned and replastered. Relaying of lime-cement-concrete in roof terracing after dismantling of decayed concrete is in progress.

300. BABUR'S GARDEN, JHOR, DISTRICT DHOLPUR

Random rubble stone masonry work in underpinning and providing flooring has been carried out.

301. Fort, Bhatner, District Hanumangarh

Bastion No. 10 has been repaired by underpinning with old brick masonry matching the original. Work for repairing Bastion Nos. 46 to 48 in a similar manner is in progress.

302. Pundrik-Ji-Ki-Haveli, Brahmpuri, Jaipur, District Jaipur

Reconstructed R.R.stone masonry wall and steps at the entrance to control entry of rain-water. Replastering and colour washing of the walls have been carried out.

303. Fort, Jaisalmer, District Jaisalmer

A portion of the decayed lower fortification wall with ashlar stone masonry facing has been reconstructed. The work on the remaining portion is in progress.

304. Fort, Kumbhalgarh, District Rajsamand

Parking area was developed near Vedi Temple by providing R.R.stone flooring. A pathway of R.R.stone masonry has been provided between Nimbhu Pol to Tara Burj and Badal Mahal going downwards. Work is in progress.

305. Harshnath Temple, Harsh, District Sikar

An approach road from the road to the Harsh Nath Temple has been maintained and filling of R.R.stone with earth by proper compaction and watering in the depression and R.R. masonry in L.C.M has been provided.

Lucknow Circle

UTTAR PRADESH

306. Tomb of Khushro's Mother, District Allahabad

Plastering work on the concrete floor, resetting of stone, pointing work of the tomb with combination mortar has been completed as per the original.

307. Tomb of Khushro's Sister, District Allahabad

Resetting and pointing of the stone masonry wall of the tomb has been completed as also the re-setting of stone slabs has been completed.

308. Vishnu Temple, Garhwa Fort, District Allahabad

Resetting of stone slabs in the wall of *mandapa* is in progress.

309. Jama Masjid, District Banda

Construction of boundary-wall around the mosque is in progress.

310. Kalinjar Fort, District Banda

The repairing of the fortification wall of the fort near Neelakantha Temple is in progress with the help of new and old stones in combination mortar. The restoration work of verandah, opposite the main temple has been done.

311. Excavated Tank (Sahet), Sravasti, District Behraich

Pointing, underpinning, watertightening and resetting of second retaining wall of the north-east

corner of the excavated tank has been done. The silt deposits of the tank have been removed to confirm its base.

312. BAHU BEGUM'S TOMB, DISTRICT FAIZABAD

Lime-plaster work along with moulding gateway has been completed after filling gaps. The plaster work of the western side facade is in progress.

313. BANI KHANAM'S TOMB, DISTRICT FAIZABAD

Repairing work of the pathway and structural repairs to the dome of the tomb are in progress.

314. GULAB BARI, DISTRICT FAIZABAD

Lime-plaster work of the interior of *baradari* has been completed matching with the original. Moulded and richly-carved plaster in the vaulted ceiling and laying of fresh lime-concrete on the ground floor have been done.

315. PANCH MAHAL, JHANSI FORT, DISTRICT JHANSI

Laying of concrete and plastering work has been completed and removal of debris from the lowest cells of Panch Mahal has been done. Lime-plastering work is in progress wherever required. On the roof of the Panch Mahal, asbestos sheet has been provided.

316. RAM MAHAL, DISTRICT JHANSI

Reproduction of geometrical and floral designs in lime-mortar has been completed near the main entrance of the Mahal.

317. KATCHERI CEMETERY, DISTRICT KANPUR

Fourteen graves and memorial pillars were restored by underpinning, patch plastering and pointing in combination mortar. The repair work of a 220 m long pathway inside the monument has been completed.

318. EXCAVATED SITE, KAUSAMBI, DISTRICT KAUSAMBI

Resetting, pointing, underpinning work of the burnt brick structures near Asokan pillar area has been completed.

319. JAINA TEMPLE, CHANDPUR, DISTRICT LALITPUR

Construction of boundary-wall around the temple has been completed.

320. SAHASRA LINGA TEMPLE, CHANDPUR, DISTRICT LALITPUR

Construction of boundary-wall around the temple has been completed.

321. VISHNU-LAXMI-NARAYAN TEMPLE, CHANDPUR, DISTRICT LALITPUR

Construction of boundary-wall around the temple is in progress.

322. GUPTA TEMPLE, DEOGARH, DISTRICT LALITPUR

Construction of a pathway running along the boundary-wall with the help of flag-stone has been completed.

323. NEELAKANTHA TEMPLE, PALI, DISTRICT LALITPUR

Construction of a retaining wall with C.R. stone masonry, lime-concrete flooring and pointing work have been done in the temple. Relaying of

lime-cement-concrete of roof terrace of the main temple has also been completed.

324. ASAF-UD-DAULA'S IMAMBARA, DISTRICT LUCKNOW

Moulded and richly-carved plastering of the eastern wing along with simple lime-plastering has been done thoroughly after removing the dead and decayed plaster and matching with the original.

325. AMJAD ALI SHAH MAUSOLEUM, DISTRICT LUCKNOW

Simple moulded lime-plastering of the graves has been completed. The work of richly-carved plaster of the facade of mausoleum has been done. Lime-concrete flooring has been provided to the main hall.

326. DILKUSHA PALACE, LUCKNOW, DISTRICT LUCKNOW

The work of underpinning, crack filling, watertightening with combination mortar has been provided to the north-east building of the Dilkusha Palace. Boring/drilling work in the south-east corner of the palace has been completed.

Construction of ornamented compound-wall facing the southwestern side of the Dilkusha has been started.

327. NASEER-UD-DIN-HAIDER'S KARBALA, DISTRICT LUCKNOW

Work like underpinning with the help *of lakhauri* bricks along with simple and moulded lime-plaster has been provided to the eastern side of the north-east building.

Stiching of cracks and lime-plastering have been completed in the vaulted ceiling of the southeastern side hall, matching with the original.

328. RESIDENCY BUILDINGS, LUCKNOW, DISTRICT LUCKNOW

Construction of boundary-wall on the eastern and western sides has been completed. Lime-concrete flooring has been provided to the Fayrer's house. The pathway in front of the same building has also been completed.

In the Banquett hall, watertightening, underpinning, pointing, edging and also the work of pathway in front of the hall has been done matching with the original. The work of concrete flooring has been completed.

329. SADAAT ALI KHAN'S TOMB, DISTRICT LUCKNOW

The eastern facade including *chhajjas,* parapet wall and miniature domes were underpinned and the rich mouldings were reproduced and lime-plastered, matching with the original.

The missing and badly damaged stones of the pathway from the corner of Sadaat Ali Khan to Musheer Zadi Tomb have been replaced with the new ones and the existing stones have been reset. The base has been repaired with lime-concrete and pointing has been done in combination mortar wherever required.

330. SIKANDAR BAGH BUILDING, DISTRICT LUCKNOW

The work on the inner pathway around the ancient wall has been going on and a new compound-wall

has been provided to facilitate the visitors who can take a full round of the monument.

Removal of debris on the northeastern side cells has been done and small structures *of lakhauri* bricks like pillar, partition wall, arches have been exposed.

331. MAKARBAI TEMPLE, DISTRICT MAHOBA

A boundary-wall of 1.50 m height with C.R. stone masonry around the temple has been raised. An apron with flag-stone around the foundation of the temple has been provided.

332. SENAPATI MAHAL, KULPAHAR, DISTRICT MAHOBA

Underpinning, plastering and pointing were done wherever necessary to the top floor of the Mahal. Simple lime-plaster work towards the west side floor and north side pillars, gallery, side walls (east and west) and top floor of middle courtyard has been provided.

333. TEMPLE AT MOHARI, DISTRICT MAHOBA

The reconstruction of the temple has been completed with the help of new and old stones in combination mortar after strengthening the foundation.

Construction of 1.5 m high boundary-wall around the temple with C.R. stone masonry with cement-sand mortar (1:6) was provided. An iron gate with lock system was added to the compound-wall for security purpose. An apron of flag-stone has also been provided around the temple.

334. SIVA TEMPLE, URVARA, DISTRICT MAHOBA

A boundary-wall of 1.50 m height with C.R. stone masonry around the temple has been raised. An apron with flag-stone around the foundation of the temple has been provided.

335. EXCAVATED SITE, PIPRAHWA, DISTRICT SIDDHARTH NAGAR

The underpinning, watertightening, resetting of ancient bricks, filling of joints of northern and eastern monasteries have been completed with combination mortar matching with the original.

MINI CIRCLE

336. BASILICA OF BOM JESUS, OLD GOA, DISTRICT NORTH GOA

The wooden planks in the ceiling of the quadrangle portion decayed due to aging and humidity, have been removed and replaced with fresh ones to avoid further damage. Besides the damaged wooden entrance doors, have been restored by fresh ones.

337. MAUSOLEUM OF ST.FRANCIS XAVTER, OLD GOA, DISTRICT NORTH GOA

The Mausoleum has been restored by "Opificio delle Pietre Dure, Florence, Italy" in collaboration with the Survey. The rectangular Mausoleum was built in 1598 to keep the body relics of St. Francis Xavier. It has two tiers with a short railing on top, received by the reliquary. Both the tiers were decorated with marble casing slabs of different hues and texture brought from Italy, France and Turkey.

The second tier is decorated with bronze plaques on all the four sides. The centre portion depicting the episodes of St. Francis Xavier during his life time. The four corners of the longer axis are decorated with rectangular Lilly foliage vertical panels with marble inlay work.

The present restoration work aims to restore the part of already reintegrated ones during Portuguese times by the same marble components and to realign some of the misaligned casing slabs and the *adhishthana* mouldings. Besides, it also aims at repairing to the white alabaster cherubs adorning the cornice and mechanical cleaning of the entire Mausoleum.

In the first phase of restoration the four foliage panels have been taken up besides resetting of the misaligned moulded encasement slabs. Some damaged parts like lilly flowers, buds, leaves, stem etc. were already reintegrated during Portuguese time by using some lime based material which had already lost their strength. These portions have been removed mechanically during the present restoration so as to take the moulds in silicon resin. These moulds were carried to Italy to fabricate the missing portions of the foliage in same stone. There was reserve marble stone in the above institute which was originally used during 1598; the same institute is now restoring the mausoleum after four hundred years.

The moulded base and cornice built of mottled yellow marble from Sienna had developed several cracks and were reset by using lime based binding material often reinforced with iron clamps and dowels during the Portuguese time. These encasing moulded stones were not in alignment and some of the reintegrated material had lost their strength. Hence the northern side has been taken during this phase. The misaligned portions of the moulding at base and cornice have been removed by raking off the dead binding material and mended with polyester resin mixed with hardener. After mending the broken parts, the same has been refixed in alignment. The gap filling for correct alignment has been done by sand + lime in distilled water. Some portions of these muldings were missing here and there, for which moulds have been made so as to fabricate in original stone.

Pair of Cherub made of alabaster on the four sides of the upper tier was cleaned from dust and dirt and moulds of the missing portions like wings, hands and fingers have been taken in silicon resin.

It has been observed that the iron dowels and clamps used while fitting the marble casing slabs and also to the slabs used in the core of the Mausoleum, had got rusted and were causing damage not only to the inner core but also to the veneering slabs due to expansion and contraction. While undertaking restoration, some of the rusted iron dowels were replaced by stainless steel ones.

In the ceiling wooden planks of the quadrangle portion had decayed due to aging and humidity. The damaged wooden planks have been removed and replaced with fresh ones to avoid further damage to the ceiling. Besides, the damaged wooden entrance door has been restored by fresh pieces of wooden planks.

During the second phase of work, the freshly carved missing components with the help of moulds were brought and refixed to the four foliage panels.

The mausoleum had bronze banner frames on all the four sides decorating the upper tier with carved alabaster eyes fitted at the centre, depicting scenes of sunrise and animal motifs. One of these frames that had dislodged long ago was refixed by using threaded steel bars now. These eyes were restored in full by filling the missing portions with artificial material and applying suitable colours. All the frames were refixed.

The damaged parts of baby angles and some carvings of the lower tier have been restored in lime + marble + acrylic resin + water with plaster of pans. The major misaligned and dislodged moulded casing slabs have been dismantled and refixed in alignment. Polishing was carried out with electrical shaft, grinder and manually with waterproof abrasive paper/stick and pumice stone.

The general cleaning was done with spirit, acetone and finally with distilled water. The polishing was done with microcrystallin wax polish (Amber).

338. Se' Cathedral Church, Old Goa, District North Goa

The original conical tiled roof of the Blessed Sacrament was removed and replaced by the flat concrete/tile roof, long ago which allowed water percolation through the joints of the flat tiles resulting in deterioration of the beautiful paintings of the ceiling of Blessed Sacrament. It also affected the pure gold panel paintings embedded in the wall. Published old photographs have really solved the problem of the above mentioned damage to the ceiling depicting the original conical tiled roof over this Blessed Sacrament. In fact, the dampness increased due to the flat roof which was done by mistake. However, recently the Mini Circle, Goa has provided the Mangalore conical high tiled roof over the wooden rafters as per the original design and M.S trusses in order to divert the load over the walls.

The approach iron staircase of the bell tower which was completely rusted was removed and repaired by providing new M.S. angles, wooden steps etc.

Patna Circle

BIHAR

339. Ancient Site of Vikramshila Monastery, Antichak, District Bhagalpur

The damaged portions of the Jaina temple-complex, Hindu temple-complex, Postern gate and votive stupas have been restored and consolidated by way of pointing, underpinning and watertightening of the top three courses.

340. Ancient Site, Kolhua, District Muzaffarpur

The main stupa and recently exposed votive stupas have been consolidated by way of dismantling and resetting of bricks, pointing and watertightening. Boundary-wall consisting of dwarf wall grill fencing has been constructed partly.

341. Excavated Remains, Nalanda, District Nalanda

A portion of the wall that had fallen due to heavy rains has been restored with the same bricks as per

the original. Dwarf wall with grill fencing has been partly constructed to check trespassing and encroachments.

342. Excavated Remains, Kumrahar, District Patna

A high boundary-wall of bricks with cement mortar and barbed-wire fencing over it, has been constructed on the southern side of the excavated remains to prevent trespassing.

343. Hasan Shah Suri's Tomb, Sasaram, District Rohtas

Decayed doors and windows have been replaced by new ones matching with the original. The pathway leading to the mosque has been repaired.

344. Sher Shah Suri's Tomb, Sasaram, District Rohtas

Decayed plaster from the roof of *burjis* and *chhatris* has been removed and replastered with lime-*surkhi* mortar as per the original. Apron around the wall of the upper floor has been repaired by way of pavement of stone slabs over a rammed floor of lime-*surkhi* and brick-jelly in order to check seepage of rain-water into the foundation of the wall. The wall of Qanati Mosque in front of the entrance has also been repaired by resetting of stones and recess pointing.

345. Residential Complex of Dr. Rajendra Prasad, Jiradei, District Siwan

The damaged roof of *baithak* portion has been recasted after replacing rotten wooden beams and batterns. Walls have been replastered with cement-sand mortar after removing the decayed ones. Damaged doors and windows have been repaired and repainted. A beautiful garden has been laid in front portion of the house and a pathway has been provided for easy movement of visitors.

UTTAR PRADESH

346. Old Fort, Jaunpur, District Jaunpur

In continuation of the previous year's work (*1996-97,* p.291), restoration work of the western fortification wall has been done with ashlar stone facing matching with the original. The core has been filled with rubbles and bricks laid in courses.

347. Excavated Remains at Kushinagar, District Kushinagar

In continuation of the previous year's work, (*1996-97,* p.291), the roof of the Nirvana Temple has been repaired by removing the decayed chunks of plaster and laying a fresh layer of cement-concrete mortar. The cracks have been grouted to avoid seepage of rain-water. The dead plaster of the facade of the temple has been removed and replastered with cement-sand mortar. Other structures around the temple has been consolidated by underpinning, pointing and watertightening of top two courses. Surrounding area has been dressed to avoid stagnation of rain-water.

348. Alamgir Mosque, Dharahra, District Varanasi

The cracks on the roof and the wall have been filled up by grouting. Thorough pointing of the paved stone slabs in the courtyard has been done to check the seepage of rain-water.

349. CHOUKHANDI STUPA, SARNATH, DISTRICT VARANASI

In continuation of the last year's work *(1996-97,* p. 292), the scientific clearance has been done to expose the southern side of the stupa and restored with special size bricks with *lime-surkhi* mortar as per original. The lower terrace on the north-east has been consolidated by watertightening on top and recess pointing on the face.

SRINAGAR CIRCLE

JAMMU AND KASHMIR

350. SHANKARAGAURISVARA TEMPLE, PATTAN, DISTRICT BARAMULLA

The damaged fencing was repaired by providing dwarf wall on one side of the temple. In order to prevent flow of water from outside into the premises, the height of the dwarf wall was also raised.

351. SUGANDHESHA TEMPLE, PATTAN, DISTRICT BARAMULLA

A portion of the damaged fence was repaired by providing barbed-wire fencing over the dwarf wall.

352. AKHNOOR FORT, AKHNOOR, DISTRICT JAMMU

To prevent further erosion of the embankment and to strengthen the wall of the palace on the river side, a retaining wall was constructed to safeguard the monument from being damaged. Cracks in the buttress wall lying adjacent to this wall were also stitched. The base of the small bastion which had fallen was also restored. Vertical cracks on the northern gateway were also stitched. The damaged parapet wall of the roof of the palace was repaired and watertightened.

353. ANCIENT SITE, AMBARAN, DISTRICT JAMMU

Part of the area was acquired for protection of the site and was enclosed by proper fencing to prevent encroachments.

354. HARI-HARA TEMPLE, BILLAWAR, DISTRICT KATHUA

Partially fallen compound-wall lying to the southern side of the platform was restored as per the original. Retaining walls to the west and east sides of the temple were provided. A boulder stone masonry apron around the platform was also provided.

355. BUDDHIST MONASTERY, ALCHI, DISTRICT LEH

The leaking roof of the Lha Khang Soma was watertightened and plastered after removing the earth packing. The damaged compound-wall on the back side of the Lha Khang Soma was also repaired in accordance with the original pattern.

356. PHYANG MONASTERY, PHYANG, DISTRICT LEH

In continuation of the previous year's work *(1996-97,* p. 293), part of the leaking roof of the main Dukhang and its Sky lights was watertightened after removing the earth packing to minimise the load.

357. SHEY PALACE, SHEY, DISTRICT LEH

In continuation of the previous year's work *(1996-97,* p. 293), the restoration and reconstruction of the central portion of the palace (pis. 197-198)

PLATES 197-198



197



198

Shey Palace, Ladakh : 197, *during and* 198, *after conservation*

THRISSUR CIRCLE

KERALA

365. ST. FRANCIS CHURCH, FORT KOCHI, DISTRICT ERNAKULAM

The leakage in the roof was arrested by replacing the tiles. The railings of the upper gallery were repaired as per the original pattern with timber members.

366. FORT ST.ANGELO, KANNUR, DISTRICT KANNUR

The fallen outer moat wall of the fort was reconstructed by carrying out underpinning wherever necessary with laterite stone masonry.

367. BEKAL FORT, PALLIKKARE, DISTRICT KASARGOD

The fallen eastern side wall of the outer fortification was reconstructed by underpinning and reconstructing as per the original wherever necessary.

368. TELLICHERY FORT, TELLICHERY, DISTRICT KOZHIKODE

The old office building inside the fort was repaired by replacing the broken tiles and strengthening the laterite wall by plastering. The underground sub-way in southeastern corner was completely exposed and conserved with lime-plaster to prevent further fall of laterite blocks.

369. FORT ANJENGO, A.NCHTHENGU, DISTRICT THIRUVANANTHAPURAM

The collapsed north side inner wall of the fort was reconstructed with the laterite blocks and plastered with combination mortar.

370. SIVA TEMPLE, CHEMMANAMTHITTA, DISTRICT THRISSUR

The laterite *prakara* wall of the temple on the eastern and western sides had collapsed. The eastern and western sides of the wall was restored by underpinning wherever necessary and also giving the original shape at the top level. The coping of the wall which is semicircular in section was restored.

371. SrvA TEMPLE, PALLIMANAH, DISTRICT THRISSUR

The wooden superstructure of the Srikoil (sanctum) was found completely worn-out due to termite attack. The roof was removed and after providing damp-proof bedding below the wall plate, it was reset by replacing the affected beams etc. with new teak wood beams.

372. SIVA TEMPLE, PERUVANAM, DISTRICT THRISSUR

The wooden ceiling of the roof of *chuttrambalam* was completely affected by termites. The entire roof was removed and damp-proof bedding was given over the laterite wall, and just below the wooden wall plate, the roof was rebuilt by replacing the worn-out beam members with that of the new teak wood.

373. MAHADEVA TEMPLE, THIRUVANCHIKULAM, DISTRICT THRISSUR

The accretionary structures over the eastern *gopura* were removed and the original Kerala type *padipura* was restored. The wooden roof of the *chuttrambalam* was dismantled and reerected as per the original. The leaking and corroded copper plates of the Srikoli (sanctum) were replaced with the new

plates of the same pattern and the leakage of the sanctum was completely arrested.

VADODARA CIRCLE

GUJARAT

374. ASTODIA GATE, AHMEDABAD, DISTRICT AHMEDABAD

In continuation of the last year's work *(1996-97,* p. 294), the deteriorated, damaged and out-of-plumb ashlar stone masonry of gateway arch has been photo documented properly after numbering the stones before dismantling and lowering down the stones of the gateway arch. The gateway arch has been reconstructed with new fine chisel-dressed Dhangandhra stones as per original in plumb and alignment. Deteriorated and damaged architectural members, such as *kumbhis,* pilasters and brackets have also been replaced with new fine chisel-dressed Dhangandhra stone, matching the original. Broken masonry effect has been given on the side walls of the arched gateway in brick masonry in lime mortar to give an impression of missing fortification wall. The roof terrace of the gateway has also been made watertight by laying a layer of fresh lime-cement concrete mixed with water-proofing compound. Work has been completed.

375. BRICK MINARS, RAILWAY PLATFORM No.l, AHMEDABAD, DISTRICT AHMEDABAD

The weathered, damaged and missing intricately and artistically carved different sizes of ancient bricks of lower parts of the minars have been replaced with specially manufactured special sized bricks of the original size matching in colour and texture, with moulding work by skilled masons from Rajasthan matching with the original existing specimen in lime-cement mortar. Work is in progress.

376. KALUPUR GATE, AHMEDABAD, DISTRICT AHMEDABAD

The decayed and deteriorated veneering stones (east side) and out-of-plumb stone masonry of the gate has been photo-documented properly after numbering the stones and preparation of drawing before dismantling masonry including hearting. The ashlar masonry with moulding work reconstructed with fine chisel-dressed plain ashlar stone masonry in lime-cement mortar with recessed pointing matching the original. The work is in progress.

377. PREMABHAI GATE, AHMEDABAD, DISTRICT AHMEDABAD

The decayed and damaged lime-concrete of the roof terrace of the gate has been removed. After removal of the roof concrete, the old, decayed and damaged wooden beams and rafters have been removed and replaced with fresh teak wood beams and rafters. The wood work has been applied with coal tar and wood preservative and a layer of fresh lime-cement-concrete mixed with water-proofing compound has been laid on the roof of the gate to arrest leakage. The decayed and damaged veneering stones, pillar bases and pilasters have also been replaced with fresh fine chisel-dressed Dhangandhra stone matching the original with moulding. The work remained in progress.

378. RANI SIPRI MOSQUE, AHMEDABAD, DISTRICT AHMEDABAD

The decayed and damaged stones of the flight of steps leading to the mosque and courtyard flooring have been removed after proper photo documentation and replaced with new matching fine chisel-dressed Dhangandhra stone laid over a layer of bed concrete maintaining original pattern. The work was completed.

379. CITADEL WALLS, PAVAGADH, DISTRICT GODHRA

The bulged and out-of-plumb portion of the citadel wall has been taken out for resetting in plumb and alignment after proper documentation. The fallen and missing portions of the southern-side citadel wall and bastion have been restored with ashlar stone masonry in lime-cement mortar after retrieving the original stones from the fallen debris along with the taken out portion of the wall in plumb and alignment. The missing *kangiiras* have also been reconstructed as per existing pattern.

380. GATE NO.2 (BLDHIYA GATE), PAVAGADH, DISTRICT GODHRA

The damaged and missing *kangiiras* have been reconstructed in random rubble stone masonry as per original *kangiiras.* Dislodged stone steps have been taken out and reset in plumb and alignment as per the original pattern. The missing rubble stone pitching of the fort wall has been provided in lime-cement mortar. The wide joints of rubble stone masonry have been underpinned and sealed with lime-cement mortar to strengthen the fort wall.

381. VENI MADHAVA TEMPLE IN THE COMPLEX OF DWARAKADHISH TEMPLE, DWARKA, DISTRICT JAMNAGAR

The stone architectural members like lintels, beam, brackets and *kumbhi,* etc. of *sabha-mandapa* of Veni Madhava Temple had decayed, damaged, cracked and worn-out due to action of saline winds. Therefore, stone masonry pillars were provided to support the superstructure to avoid any accident. Drawings were prepared and photo documented before dismantling and lowering down the structure of *sabha-mandapa.* The *sabha-mandapa* has been reconstructed by replacement of cracked, decayed, damaged and pulverised stone architectural members with new fine-dressed stone pillar bases, pillars, capitals, lintels, *chhajja* stone with original mouldings and carvings and placed in their original positions with the help of chain pulley blocks. The *sabha-mandapa* has been reconstructed upto lintel level. The work is in progress.

382. GOKESHVARA MAHADEVA TEMPLE, LOWRALI, DISTRICT JAMNAGAR

In continuation of the last year's work *(1996-97,* p. 294), the entire temple had been dismantled and lowered down including *sabha-mandapa* and porches upto the base level after proper drawing and photo-documentation with the help of chain pulley blocks and scaffolding. The base has been strengthened and levelled with stone masonry. The temple has been reconstructed with the original dismantled stones.

The missing and decayed stone pillars, capitals, lintals, *chhajjas,* etc. have been replaced with fresh fine chisel-dressed stone pillars, capitals, lintels, etc. with original mouldings and carvings and set in their original positions with the help of chain pulley block and scaffolding. A stone-paved apron laid over base concrete has also been provided around the temple to check the ingress of rain-water into the foundation of the temple to prevent any settlement in the future. The work has been completed (pis. 201-202).

383. ASOKAN ROCK EDICTS, JUNAGADH, DISTRICT JUNAGADH

Damaged M.S. grills have been repaired for safety of the rock edicts. G.I. pipe railing has also been provided around the rock edicts to keep visitors away from the inscriptions. Interiors of the structure over the rock edicts have been painted with distemper and exterior with cement paint. Doors and windows have been painted with enamel paint. The work has been completed.

384. BUDDHIST CAVES, JUNAGADH, DISTRICT JUNAGADH

The Buddhist caves at Uperkot have been provided with M.S. grills and G.I. pipe railing for safety and easy movement of the visitors.

385. RAO LAKHA CHHATRI, BHLJ, DISTRICT KACHCHH

Decayed and damaged concrete of the roof terrace and dome of the main *chhatri* has been replaced with fresh lime-cement-concrete and made the roof terrace and dome of the *chhatri* watertight. The damaged and missing platform of a small *chhatri* has been restored with the stones available at the site. The fallen and missing pillars, capitals, lintels and other components of the *chhatri* have been sorted out for proper identification and the *chhatri* was restored to support the hanging half dome including watertightening the top. The work has been completed.

386. EXCAVATED SITE, DHOLAVIRA, DISTRICT KACHCHH

The third largest Indus Valley site at Dholavira, with its three main parts (I) Citadel (11) Middle town and (III) Lower town, consisting of uncoarsed rubble stone masonry fortification, covered drains and remains of houses. These structures were exposed in partly damaged condition. The loose and sunken base portions of the eastern gate of the citadel and walls of the middle and lower towns have been taken out carefully and the base was consolidated, stabilised and levelled with lime-cement-concrete and restored in lime mortar as per original. The remaining work is in progress.

387. GATEWAY OF KHAN SAROVAR, PATAN, DISTRICT PATAN

The fallen southern side fort walls facing the east have been restored in brick masonry using old bricks of the fallen portion in lime mortar as per the existing ones. The work remained in progress.

388. RAM-KI-VAV, PATAN, DISTRICT PATAN

In continuation of the last year's work *(1996-97,* p. 296), the missing portion of northern side wall

PLATES 201-202



201



202

Gokeshvara Mahadeva Temple, Lowrali : 201, *before and* 202, *after conservation*

and terrace platform has been restored with fine chisel-dressed ashlar stone masonry including hearting masonry matching with the original. The work remained in progress.

389. SAHASRALINGA TALAV (EXCAVATED), PATAN, DISTRICT PATAN

The base of the main temple located in the bed of the tank, covered with silt due to heavy flood has been exposed by desilting the tank. The cutting on the slopes of the banks which had developed due to floods has been filled up with earth to prevent any damage and erosion of soil in future. Some stone architectural members have also been retrieved during desilting. The work remained in progress.

390. SHAIKH FARID TOMB, PATAN, DISTRICT PATAN

The decayed and damaged lime-plaster of the plinth has been removed and replastered to check the ingress of water in plinth and foundation. Random rubble stone masonry supports have been provided to the riverside wall and protect the tomb from any damage due to flood water. Stone apron has also been provided on the concrete base in front of the platform of the tomb to check the ingress of water in the foundation. The work has been completed.

391. OLD DUTCH AND ARMENIAN TOMB AND CEMETERIES, SURAT, DISTRICT SURAT

The cavities have been underpinned. The decayed and damaged plaster has been replaced with fresh plaster including minor mouldings and motifs as per original. The decayed and damaged concrete has been replaced with fresh lime-cement-concrete and the tomb has been made watertight. The work has been completed.

392. OLD ENGLISH TOMB, SURAT, DISTRICT SURAT

In continuation of the last year's work (*l 996-97,* p. 296), the wide crack that had developed in the dome has been grouted and sealed. Cavities have been underpinned and decayed and damaged plaster of the walls, pillars and ceiling, etc. has been replaced with fresh plaster with minor mouldings, motifs and decorative design as per original. Damaged walls and pinnacles have been restored. The decayed and damaged concrete of the roof terrace and floor have been replaced with fresh lime-cement-concrete and made the roof terrace watertight. M.S. grill gate has also been provided and fixed on the entrance of the monument premises and apron of the monument. The work has been completed.

393. NAVLAKHA TEMPLE, SEJAKPUR, DISTRICT SURENDRANAGAR

In continuation of the previous year's work (*1996-97,* p. 296), the highly decorative plinth has been rebuilt upto the floor level of the temple after consolidation, strengthening, levelling and providing proper foundation. All the useful architectural members and stones have been reused in the reconstruction. Decayed, damaged and missing architectural members have been replaced with fresh fine chisel-dressed stones with original moulding and carving as per original. The work remained in progress.

394. Vadodara Gate and its Adjacent Construction, Dabhoi, District Vadodara

The damaged G.I. barbed-wire fencing on the angle iron post has been replaced with brick masonry dwarf wall mounted with chain link fencing for safety and security of the monuments and to check encroachment. Drinking water facility has been provided at the monument by arranging a new water tap connection. The work has been completed.

395. Ancient Site (Excavated), Kayavarohan, District Vadodara

The protected area around the ancient excavated site has been enclosed with masonry dwarf wall mounted with chain link fencing for safety of the excavated structures and avoid any encroachment. The work has been completed.

396. Fresco Rooms in Bhau Tambekarwada, Vadodara, District Vadodara

The decayed, damaged and cracked teakwood planks and beams have been replaced with fresh teakwood planks and beams. To avoid moisture effect on murals, the roof terrace has been made watertight by laying tar felt after filling up the pot holes with lime, cement and sand mortar. All the exposed wooden members have been painted with enamel paint to prevent from further deterioration. Lightning conductor has also been provided for the safety of the monument. The work has been completed.

DAMAN AND DIU

397. Chapel of our Lady Rosarios, Moti Daman, Daman

Material required for repairs and reconstruction of decayed and damaged roof including replacement of damaged and decayed wooden beams, rafters and planks, etc. have been procured for execution of the work. The work remained in progress.

398. Church of our Lady Remedios, Moti Daman, Daman

In continuation of the last year's work *(1996-97,* p. 294), the damaged and decayed wooden members of the roof and Manglore tiles have been replaced with fresh wooden members and roof tiles to arrest the leakage of rain-water and make the roof watertight. The old, dead, decayed and damaged floor concrete of the open verandah has been replaced with fresh lime-cement-concrete. The dead, decayed and damaged plaster of the steps has also been replaced with fresh plaster matching with the original. The interior has been painted with distemper and exterior with colour wash. The doors and windows have also been repainted with enamel paint.

399. Ruined Church, Moti Daman, Daman

Protected area around the Church has been enclosed with brick masonry dwarf wall mounted with chain link fencing for safety of the monument, to prevent encroachment and to develop a garden around the church.

400. Fort and Inside Buildings, Diu

In continuation of the last year's work *(1996-97,* p. 294), the damaged and decayed plaster of the interior and exterior of the buildings inside the fort known as Officer's mess has been replaced with fresh plaster. The damaged and decayed doors and windows have been replaced with fresh doors and windows. Interior and exterior of the structures inside the fort have been washed and doors and windows have been painted with enamel paint.

The stones of flooring and walls of the jetty, decayed and damaged due to salty water and winds have been replaced with fresh, fine-dressed ashlar bela stones matching the original to strengthen the jetty.

The decayed and damaged flooring stone of the gates near the jetty which had weathered due to sea water and winds have been taken out and replaced with fresh chisel-dressed bela stones and laid over lime-cement-concrete base as per the original. The work remained in progress.

X. ARCHAEOLOGICAL CHEMISTRY[1]

ANDHRA PRADESH

1. Sri Virabhadrasvamy Temple, Lepakshi, District Anantapur

In continuation of the last year's *(1996-97,* p. 300) work, the paintings of Sri Virabhadrasvamy Temple (main temple) was subjected to chemical treatment for the removal of oily and tarry matter. 5% aqueous mixture of ammonium carbonate and ammonium bicarbonate was used with the help of tissue paper. Weak plaster was also consolidated using appropriate method and materials. The treated surface was preserved with 1 % polyvinyl acetate in toluene. An area of 30.0 sq.m. has been chemically cleaned and preserved during the period under review.

2. Sri Bhimesvarasvamy Temple, Samalkota, District East Godavari

An area of about 125 sq m has been treated during the period under review. The stone sculptures of this temple were covered with micro-vegetational growth and lime-wash coats at some places. A solution of aqueous ammonia and teepol (3:1) was used for the removal of moss and lichen and 5% acetic acid was used for lime-wash removal.

3. Sri Golingesvarasvamy Temple, Biccavolu, District East Godavari

A total area of 965 sq m of this temple has been taken up for chemical treatment and preservation work during the year under review. The beautifully carved and decorated stone structure was covered with micro-vegetational growth of moss and lichen. A mixture of 3% solution of ammonia and 1% non-ionic detergent was used for the eradication of vegetational growth. At some places, a solution of 1-2% oxalic acid was also used to remove patches of lichen growth. The cleaned surface was given fungicidal treatment with 3% sodium pentachlorophenate and preserved with 2-3% polymethyl methacrylate in toluene. The work has been completed.

'Information from: The Director, Science Branch of the Survey, Dehradun.

4. Charminar, Hyderabad, District Hyderabad

The plaster of Charminar which was affected at some places due to thick growth of moss and heavy accumulation of dust and dirt, after thorough brushing by chemico-mechanical method using aqueous ammonia and non-aqueous detergent in 3:1 ratio. The fungicidal treatment was given over the chemically cleaned surface with 1% solution of sodium pentacholorophenate and the preservation was carried out using two component systems *viz.,* aqueous solution of Repellin super in desired concentration and a cost of 2-3% PMMA in toluene on the completely dried surface. 41 % of the work has been completed (pls. 203-204).

5. Nava Brahma Main Temple (Balabrahmesvarasvamy), Alampur, District Mahaboobnagar

The thick lime-wash coat from the surface of stone sculptures was removed by applying chemico-mechanical methods using 4-5 % acetic acid solution, followed by treatment with dilute aqueous ammonia and finally with water. A dilute solution of caustic soda was used to remove the overlying coats of acrylic paints over the door-jambs followed by thorough washing with water. The cleaned dried surface was preserved with 2-3 % polymethyl methacrylate solution in toluene (pls. 205-206).

6. Sri Mukhalingesvarsvamy Temple, Sri Mukhalingam, District Srikakulam

The stone sculptures were subjected to chemical treatment for the removal of thick growth of moss and lichen and also for thick lime-wash coat on the northern and southern walls and the *sikhara* of the main temple using ammonia, teepol and acetic acid in dilute concentration. The sculptures were thoroughly washed and allowed to dry. Fungicidal and preservative treatment was also given. The work is still in progress (pls. 207-208).

BIHAR

7. Mahabodhi Temple, Bodhgaya, District Gaya

The pinnacle (made of copper) of the temple has been cleaned with dilute solution of sodium potassium tartrate. Thick growth of moss, lichen, vegetation, dust and dirt were removed using ammonia and non-ionic detergent with gentle scrubbing. Toluene was used for the removal of oil and wax patches. The cleaned surface was given fungicidal treatment with 3% solution of sodium pentacholorophenate in water. Tree killers were also used at required places. The treated surface was finally preserved with repellin super and 2% solution of polymethyl methacrylate in toluene. The work has been completed (pls. 209-210).

8. Monastery Complex (1 A), Nalanda, District Nalanda

The brick structures of the monastery was chemically treated for the removal of dust, dirt and micro-vegetational growth with 3% aqueous solution of ammonia and non-ionic detergent followed by thorough washing. The cleaned surface was given fungicidal treatment with 3% solution of sodium pentacholrophenate and the cleaned surface was preserved with repellin super in water followed

PLATES 203-204



203



204

Charminar, Hyderabad, Masjid wall : 203, *before and* 204, *after chemical treatment*

PLATES 205-206



205



206

Sri Bala Brahmesvarasvamy Temple : 205, before and 206, after chemical treatment

PLATES 207-208



207



208

Srimukhalingesvarasvamy Temple, Srimukhalingam : 207, *before and* 208, *after chemical treatment*

PLATES 209-210



209



210

Mahabodhi Main Temple, Bodhgaya : 209, *before and* 210, *after chemical treatment*

by 2% solution of polymethyl methacrylate in toluene on dried surface. The work has been completed.

9. Tomb of Shershah Suri, Sasaram, District Rohtas

The work of chemical treatment was carried out on domes, canopy and enclosing walls for the removal of moss, lichen, dust and dirt etc. with 3% aqueous ammonia and non-ionic detergent. Black patches have been removed by 5% aqueous oxalic acid. The cleaned surface was treated with sodium pentachlorophenate (3%), followed by preservative coat of repellin super and 2% solution of polymethyl methacrylate in toluene on dried surface. The work has been completed.

DELHI

10. Bada Gumbad Mosque, Lodi Garden, New Delhi

The exterior sides facing east, north, upper two domes and interior portions of the two bays, situated on each corner, facing north and south were taken up for chemical treatment. The superficial layers of dust, dirt and other accretions were removed with liquid ammonia and teepol solution using soft bristle brushes. The plastered surface was subjected to bleaching powder treatment twice for the removal of biological growth. The treated surface was given fungicidal treatment with sodium pentachlorophenate followed by application of repellin super as water repellent. The work is still in progress.

11. Tomb of Mohammad Shah (Exterior), Lodi Garden, New Delhi

The chemical treatment work was taken up for the removal of dust, dirt, etc., using a solution of ammonia and teepol. The lime-plastered surface was subjected to two applications of bleaching powder (paste) treatment to facilitate easy removal and arrest the growth of spores of microphytes as well as to consolidate the fragile portions. The treated areas were given fungicidal treatment of sodium pentachlorophenate followed by application of a water repellent *viz.,* Potassium-methyl-siliconate (Repellin super-pidilite).

12. Humayun's Tomb, Nizamuddin, New Delhi

Work was resumed for chemical treatment of lime-plastered surface of the entrance gate as well as plastered and sandstone surface for *chattris* of the main dome with the solution of ammonia and teepol using ultra soft brushes. The surface was again treated with the slurry of bleaching powder which acts as a germicide and disinfectant and facilitates the removal and consolidates the fragile plaster. The surface was given fungicidal treatment with sodium pentachlorophenate followed by application of Repellin super as water repellent. The work has been completed.

13. Red Fort-Complex, Red Fort, Delhi

Golden paintings on the wooden ceiling of Diwan-i-Khas were subjected to chemical conservation. After dry brushing, the fragile areas of the paintings were consolidated with animal glue followed by application of tissue paper over the

surface. The painted surface was subjected to chemical treatment using organic solvents including toluene, acetone, ether, etc. The wide gaps and cracks were filled in with filleting materials using zinc oxide, kaolin, texture white (camel) in animal glue, mixing them in appropriate combinations. The repaired portions were retouched as per the original tone. Finally, the surface was preserved with poly vinyl acetate in toluene. The work has been completed.

The work of exposing the hidden paintings of Hamam was resumed using chemico-mechanical method. Acetic acid was used for softening and removing the lime-wash layers with the help of stainless steel surgical equipment. Paintings and the exposed paintings were subjected to chemical treatment using solvents like methanol, toluene, turpentine, oil, etc. The cracks and the fragile areas have been consolidated using plaster of pans.

The chemical treatment was commenced from the upper portions of Moti Masjid having metallic pinnacles on the three domes and also on the top of the small minarets on the periphery of the walls enclosing the mosque. The courtyard walls (marble), stairs leading to the top of the structure (sandstone), wall facing south (lime-plaster) were chemically cleaned with liquid ammonia and teepol solutions. The plastered surface was given bleaching powder treatment for twenty-four hours and then thoroughly washed. Total lime-plastered and sandstone surface was given fungicidal treatment with sodium pentachlorophenate followed by a final coat of water repellent using repellin super (potassium methyl siliconate). The marble surface was given clay pack treatment for the removal of more adherent layers of accretions. The applied paste covered with plastic sheet was allowed to dry and removed after one or two days. Thereafter, the marble surface was thoroughly washed. Its main entrance gate made up of brass on a wooden frame was also treated with sodium potassium tartrate. The work has been completed.

The sandstone and lime-plastered surface of Naubat Khana was chemically cleaned with a solution of ammonia and teepol for the removal of superficial dust, dirt, layers of microphytes and greasy accretions. The lime-plastered area of the wall facing north was subjected to bleaching powder treatment, an effective method for the removal of vegetational growth with least mechanical efforts. The treated area was given fungicidal treatment of sodium pentachlorophenate followed by a final application of potassium methyl-siliconate as water repellent. The paint applied earlier on glasses of the window panes of the five-arched openings was removed with sodium hydroxide solution in suitable dilution. The work has been completed.

The work of chemical treatment of three-sided rampart wall was taken up under flag mast, facing Chandni Chowk. Chemical cleaning was done with the solution of ammonia and teepol for the removal of superficial accretions of dust, dirt, micro-vegetations and pollutants which were deposited on the surface due to vehicular traffic. A solution of glacial acetic acid was used for the removal of

calcareous deposits. Metallic pinnacles were treated to impart the surface a look free from dust, dirt, rust, etc. Besides, the two stone elephants situated at Delhi Gate, Red Fort, were also cleaned for the removal of dust, dirt and stains of bird's excreta etc. The work has been completed.

The lime-plastered surface of both interior and exterior sides of the three domes and the enclosing walls of the roof of Shah Burj were taken up for chemical treatment with a solution of ammonia and teepol for the eradication of dust, dirt and micro-vegetational growth using soft nylon brushes. Bleaching powder slurry was used on the surface to facilitate the cleaning and as a disinfectant, biocide and consolidant, the surface was washed with distilled water after twenty-four hours. Two or more applications were given on a few patches. The cleaned surface was given fungicidal treatment with sodium pentachlorophenate followed by the application of repellin super as water repellent. The work has been completed.

14. Safadarjung Tomb, New Delhi

The exterior surface of the dome adorned with a pinnacle made of marble was subjected to chemical treatment. The dome had accumulated thick accretion due to gradual deposition of dust, dirt, imparting a look of sandstone. The chemical treatment was done with repeated application of bentonite clay pack followed by cleaning with a solution of ammonia and teepol. The treated area was thoroughly washed with water. The lower sandstone structures were also chemically cleaned with the solution of ammonia and teepol. Solution of glacial acetic acid was also used for the removal of calcareous deposits. The sandstone surface was subjected to fungicidal treatment using 2-3% sodium pentachlorophenate followed by potassium methyl siliconate as water repellent. The work has been completed.

15. St. Fransis Assisi Church, Velha, Goa

The panel painting on the wall to the left of the main altar and wood carvings to the right of the altar were subjected to chemical conservation and repair for the removal of thick layer, old preservative layer, dirt, dust, bird's excreta besides filling of gaps between panels due to insect activity. After dusting, infested portions and gaps between the panels of paintings were sprayed with pyrethrum solution in suitable base and concentration followed by filling with paste of sawdust, fevicol, plaster of paris and pyrethrum. Mild organic solvents like diacetone alcohol, Iso-propyl alcohol, methanol, petroleum spirit and cellosolve were effectively used for removing hard accretions and old preservative layer from the painted surface. The restored portions were reintegrated and finally the paintings were preserved with a coat of dilute picture varnish. Wood carvings around the panel paintings were subjected to initial dusting and general cleaning with suitable solvents and sprayed with 2% solution of sod, pentachlorophenate in methanol followed by preservation with 2% solution of polyvinyl acetate in toluene. The work is in progress.

GUJARAT

16. MALIK ALAM'S MOSQUE, DISTRICT AHMEDABAD, AHMEDABAD

The work of chemical treatment has been carried out for the first time to extirpate vegetative accretions like moss, lichen as well as deposits of smoke, dirt, dust and bird's droppings from the structure using a mixture of dilute ammonia and teepol, weak organic acid and organic solvents. The cleaned surface was given fungicidal treatment by spraying 3% aqueous solution of zinc silico fluoride and preserved with polymethyl methacrylate in toluene. The work has been completed.

17. JAMI MASJID, DHOLKA, DISTRICT AHMEDABAD

The chemical treatment work was taken up for the first time for the removal of thick biological growth, remains of lime-wash, dust, dirt, bird's excreta and smoke, using dilute ammonical water, mixed with non-ionic detergent, 2% weak organic acid and suitable organic solvents. The treated surface was given fungicidal treatment and preserved with perspex dissolved in toluene. The work has been completed.

18. JAMI MASJID, PAVAGADH, DISTRICT GODHRA (PANCHMAHAL)

In continuation of the previous year's *(1996-97,* p.304) work, the remaining (70 %) chemical treatment work on this monument was carried out for eradication of different accretions like biological growth, dirt, dust, pigeon's excreta and smoke using suitable chemicals and solvents. Finally, the cleaned stone surface was preserved with 3% solution of perspex in toluene after fungicidal treatment.

19. THREE CELLS AND CUSTOM HOUSE, PAVAGADH, DISTRICT GODHRA (PANCHMAHALS)

The chemical treatment work on these monuments has been taken up for the first time to remove thick biological growth, bats and bee-nests, pigeon droppings, dirt and dust, using suitable chemicals and solvents. The cleaned surface was preserved after fungicidal treatment with PMMA in toluene. The work is in progress.

20. ENGLISH, ARMENIAN AND REMAINING STRUCTURES OF DUTCH CEMETERIES, SURAT, DISTRICT SURAT

The stone surface of these monuments was covered with thick biological growth, dirt, dust, pigeon's droppings and beehives. The chemical cleaning has been carried out with a mixture of ammonical water and labolenc. The cleaned surface was given fungicidal treatment by spraying 2% aqueous solution of zinc silico fluoride and finally preserved with polymethyl methacrylate in toluene. The work is in progress.

21. HAZIRA OR QUTBUDDIN MOHMAD KHAN'S TOMB, DANTESHVAR, DISTRICT VADODARA

The chemical treatment work has been carried out on the exterior and interior surfaces of this monument for the removal of beehives, bat's excreta, dirt, dust, biological growth and deposition of lime-wash. A mixture of ammonical water and teepol, weak organic acids and organic solvents were used for cleaning. Suitable fumigants were used to exterminate bats and bees. The cleaned surface was given fungicidal treatment with zinc silico fluoride and

preserved with polymethyl methacrylate in toluene. The work has been completed.

HIMACHAL PRADESH

22. Main Temple, Laxmi-Narain Group of Temples, Chamba, District Chamba

The chemical treatment work on this living temple has been carried out for removal of smoke, grease, moss and lichen. An aqueous solution of ammonia and non-ionic detergent was used with mild brushing. The surface was thoroughly washed with distilled water. The cleaned surface was treated with 1-2% solution of zinc silico fluoride in order to check the regrowth of micro-vegetation. Finally, the cleaned dried surface was preserved and consolidated with two coats of 2% solution of polymethyl methacrylate in toluene. The work has been completed.

23. Bajreshvari Temple, Badrjnath, District Chamba

This sandstone temple was affected with micro-vegetational growth and hard lime-plaster. After thorough brushing the surface was treated by chemico-mechanical method using 1-2% aqueous ammonia and non-ionic detergent (teepol). The surface was thoroughly washed with water. Hard lime deposits from the carved area were removed mechanically with care. The cleaned dried surface has been given fungicidal treatment with 1 -2% solution of zinc silico fluoride and preserved with 2% solution of polymethylmethacrylate in toluene. The work has been completed.

24. Shri Sita Ram Temple, Bangota, District Chamba

The temple was badly affected due to the deposition of grease, micro-organisms and coal tar etc. These accretions were removed with suitable chemicals and solvents. The surface was given fungicidal treatment with 1 -2 % solution of sodium pentachlorophenate in water. The dried surface was preserved and consolidated with two coats of polymethyl methacrylate in toluene. The work has been completed.

JAMMU AND KASHMIR

25. Kiramchi Temple, Kiramchi, District Udhampur

The temple was covered with rich growth of black and green coloured moss and lichen and patches of lime-wash. These superficial accretions were removed by means of chemico-mechanical method using a mixture of 2% liquid ammonia and 1 -2% non-ionic detergent in water. A solution of 1-2% acetic acid was used for the removal of lime-wash accretions. After cleaning, the surface was washed thoroughly and was given fungicidal treatment, followed by preservative treatment with 1-2% solution of polymethyl methacrylate in toluene on dried surface. The work has been completed.

26. Dera Temple, Manwal, District Udhampur

This ruined temple was covered with moss and lichen. Deep crevices and carvings, covered with lime-wash, were dislodged mostly by chemico-mechanical method with utmost care. To eradicate

the micro-vegetational growth, a solution of 1-2% ammonia and non-ionic detergent was used, followed by thorough washing with water. The fungicidal treatment has been given using 1-2% solution of zinc silico fluoride. The dried surface was preserved and consolidated by double coating of 2% solution of polymethyl methacrylate in toluene. The work has been completed.

27. Nand Babour Temple, Manwal, District Udhampur

The chemical conservation work has been carried out in order to save this restored temple from decay and deterioration due to the deposition of micro-vegetational growth, etc. Chemical cleaning was done with a mixture of 1 -2% ammonia and non-ionic detergent using gentle brushing. The surface was thoroughly washed to ensure that all traces of chemicals were washed away. After fungicidal treatment, the stone surface was preserved and consolidated by a double coating of 2% solution of polymethyl methacrylate in toluene.

28. Kala Dera Temple I, Manwal, District Udhampur

The chemical conservation work has been carried out with extra care to eradicate thick growth of micro-vegetation and superficial accretions. After thorough brushing with soft nylon brush, chemico-mechanical method was applied using 2% mixture of liquid ammonia and non-ionic detergent in water. The surface was given fungicidal treatment with 2% solution of zinc silico fluoride. The surface was preserved with a double coat of 2% solution of polymethyl methacrylate in toluene. The work has been completed.

29. Kala Dera Temple II, Manwal, District Udhampur

This temple was in its advance stage of deterioration and the stone surface was completely covered with micro-vegetation and other accretions. The chemical conservation work was carried out to eradicate thick vegetational growth using a solution of ammonia and non-ionic detergent followed by thorough washing. The cleaned, dried surface was given fungicidal treatment with 2% solution of zinc silico fluoride and preserved and consolidated with a double coat of 2% solution of polymethyl mehtacrylate in toluene. The work has been completed.

KARNATAKA

30. Hazara Ramachandra Temple, Hampi, Kamalapuram, District Bellary

Out of total estimated area of 5052 sq meter covering interior and exterior of the main shrine, the goddess shrine including Vimana and an area of 70 sq meter was taken up for chemical treatment and preservation work. The eradication of vegetational growth and lime-wash were done using aqueous solution of ammonia, neutral detergent and glacial acetic acid. The work is in progress.

31. Tomb of Ahmed Shah Wali Asthur, District Bidar

Out of total area of 818 sq m of eastern and southern wall paintings, and an area of 110 sq m has been chemically treated during the period under

review. The work of chemical conservation of the paintings was carried out in order to consolidate the friable pigments, filling of lacunae in rendering and filleting of broken edges with plaster of pans. The chemical treatment was done for the removal of superficial accretions, bird's droppings, bat's excreta using organic solvents 2-ethoxyethanol, turpentine, triethanolamine, polyvinyl acetate and toluene. The reintegration of repaired portion was done with poster colours. The work is in progress.

32. Virupaksha Temple, Pattadakal, District Bijapir

In continuation of the last year's work *(1996-97,* p. 308) work, the remaining 553 sq m area was taken up for removal of micro-vegetational growth, lime splashes, oily and sooty accretions and bat's excreta with the aqueous solution of ammonia, neutral detergent and glacial acetic acid. The cleaned surfaces on the exterior were given fungicidal treatment with 0.5 % aqueous solution of sodium pentachlorophenate followed by preservation with 1 % solution of Acrypol P 876 clear pellets in toluene.

33. Gomatesvara Statue and Adjoining Mantapas, Sravanabelagola, District Hassan

In continuation of the previous year's work *(1996-97,* p. 309), the work of consolidation of bulgings on the left foot of the great statue was taken up during the period under review. After removing the oily stains, ethyl silicate (of silica content 25%) of sp Gr 0.92 was injected into the holes of the bulges and this treatment was repeated about thirty times. The weather data like ambient temperature, humidity, wind direction, wind speed and rainfall were recorded for impact analysis studies of these parameters on building stones etc. The monitoring is still in progress.

34. Kedaresvara Temple, Halebid, District Hassan

In continuation of the previous year's *(1996-97,* p. 309) work, the remaining 1523 sq m area was taken up for the extirpation of micro-vegetational growth, lime-wash, calcareous accretions, bat's accretions etc., from the stone sculptures. The chemicals and solvents used were ammonium hydroxide, neutral detergent, glacial acetic acid, sodium hexametaphosphate, and oxalic acid. Sodium pentachlorophenate has been used as fungicide and Acrypol P876 in toluene as preservative treatment. The work has been completed.

35. Ranganathasvamy Temple, Srirangapatna, District Mandya

The sculptures and carvings in the entrance *mandapa* (interior and exterior), tower, small shrines in the outer circumbulatory passage totalling 5434 sq m were proposed for chemical treatment and preservation. An area of 466 sq m was taken up for the removal of micro-vegetation using an aqueous solution of ammonical and liquid detergent. The work is in progress.

36. Daria Dailat Bag, Srirangapatna, District Mandya

Conservation work of painting involving the consolidation of friable and powdery pigment and the rendering and removal of superficial accretions,

of old translucent preservative, reintegration of consolidated areas and final preservation. The chemicals used were 2-ethoxyethanol, methanol, turpentine, acetate and toluene.

On the ceiling, the joints of wooden panel have been covered with thin strips of canvas which act as carrier for paintings. Wherever the canvas strips were missing, they were replaced and hanging and folded ones were refixed and properly reintegrated. The work is in progress.

37. TIPU SULTAN MAUSOLEUM, GUMBAZ, SRIRANGAPATNA, DISTRICT MANDYA

Work of chemical treatment and preservation of painting, an area of 106.5 sq m were taken up for the removal of old yellowed translucent varnish coat, consolidation of the rendering in the form of filling the lacunae, colour reintegration of filled lacunae and missing pigment layer and final preservation. The solvents used were 2-ethoxyethanol with turpentine as restrainer, clear picture varnish with suitable dilution for preservation and poster colour for reintegration. The work is in progress.

MADHYA PRADESH

38. CHITRAGUPTA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the previous year's work (799(5-97, pp. 309-310), the chemical treatment has been carried out on the exterior south facing wall of the structures comprising *maha-mandapa* and the entrance porch including *sikhara* of this temple with different suitable chemicals for the eradication of moss. algae and lichen crusts from the sandstone sculptural surface. About 75 % work has been completed.

39. DEVUAGADAMBI TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Conservation work of the exterior portion of the *sikhara* and sanctum walls facing south has been done and chemically cleaned with different suitable chemicals. Nearly 68% of the work has been completed.

40. JAVARI TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the previous year's work *(1996-97,* p. 310), the remaining work of chemical treatment and preservation has been completed.

41. RAJA BIR SINGH DEO PALACE, DATIA, DISTRICT DATIA

In continuation of the previous year's work *{1996-97,* p. 310),the chemical cleaning of wall paintings of the Maharani's makeup room on the fourth floor of the palace has been continued with suitable chemicals and then preserved and consolidated with 2 % solution of polyvinyl acetate in toluene. About 20 % of the work has been completed and remaining work will be taken up next year.

42. HOSHAiNG SHAH'S TOMB, MANDAV, DISTRICT DHAR

The interior cenotaph chamber of the tomb has been taken up for chemical cleaning of its walls, *jalis* and ceiling in order to remove extraneous deposits of leached out substance as a result of seepage of rain-water. The marble surface was

cleaned with clay pack method using Bentonite clay mixed with ammonia solution E.D.T.A di-sodium salt and hydrogen peroxide in an appropriate ratio. Finally, the surface has been treated with ammonical water and non-ionic detergent. Nearly 20% of the work has been completed and the remaining work is in progress.

43. Rock-cut Caves, Bagh, District Dhar

In continuation of the previous year's work *(1996-97,* p. 310), the chemical treatment work has been carried out on the wall paintings of the eastern cells of Cave 4 for the removal of surface accretions with suitable organic solvents followed by application of a preservative coat of 2% solution of polyvinyl acetate in toluene. Mounting work of stripped painting from two columns in the vestibule of Cave 2 was taken up and the work is in progress.

44. Tomb of Mohammed Ghous, Gwalior, District Gwalior

In continuation of the previous year's work *(1996-97,* p. 311), the chemical treatment and preservation work of sandstone perforated screens of the tomb is in progress and nearly 51 % of the work has been completed.

45. Gwalior Fort, Gwalior, District Gwalior

In continuation of the last year's work *(1996-97,* p. 311), the chemical conservation work has been carried out on the stone sculptures of the Jaina Tirthankaras for the removal of micro-biological growth, bird's droppings, white-wash coating with different suitable chemicals and solvents. The work is in progress.

46. Temple-Complex 45, Sanchi, District Raisen

The chemical conservation work has been carried out on the exterior of the monument which was badly affected due to heavy growth of algae, lichen and moss. A 2% solution of ammonia mixed with non-ionic detergent was used for the removal of these deposits with the help of soft nylon brushes. The cleaned surface was given fungicidal treatment of 2% zinc silico fluoride in water. The surface was preserved with 2% solution of polymethyl methacrylate in toluene.

Some fractured stone blocks were repaired using epoxy resin mixed with powder of similar stone. Nearly 73% of the work has been completed during the period under review.

47. The Great Stupa, Sanchi, District Raisen

The restoration work has been carried out in order to provide structurally sound support to one of the two unique figures *of yakshi,* carved in sandstone, on the north gateway of the Great stupa. The missing lower legs were replaced by reproductions made in fibre glass, reinforced polyester resin. Work on the another damaged figure of the same gateway is in progress (pls. 211-212).

48. Bajarmath Temple, Gyaraspur, District Vidisha

The chemical conservation work has been carried out on the exterior sandstone structure of the temple. The stone sculptures were covered with moss, lichen, algae, lime deposits, dust and dirt. The accretionary

PLATES 211-212



211



212

Sanchi, Yakshi, north gateway : 211, *before and* 212, *after restoration*

deposits were removed with 2-5 % solution of ammonia and Ranklene (non-ionic detergent) using soft nylon brushes. The cleaned dry surface was given fungicidal treatment with 1 % zinc silico fluoride and 1 % sodium pentachlorophenate in distilled water followed by preservation. Nearly 30% of the work has been completed during the period.

MAHARASHTRA

49. Ajanta Caves, Ajainta, District Aurangabad

Paintings of the west wall, pillars 1,2,3,4 and 5 in Cave 17 and pillars 26,27,28 and 30 in Cave 10 have been subjected to chemical treatment and preservation for the removal of dust, dirt and thick coats of old varnish and other accretions using mixture of appropriate solvents in different proportion. After complete drying, the paintings were preserved with 1.5% solution of polyvinyl acetate in toluene. The work of west wall and pillars in Cave 17 and pillars in Cave 10 was completed.

The work of consolidation of loose plaster and paintings; filling of holes and cracks; fixing of bulgings and edges with plaster of paris, mixed with fevicol or polyvinyl acetate has been carried out in Caves 1,2, 17 and 21. Finally, colour matching was done using a combination of earth colours. The work of filling and fixing of holes and bulgings on the ceilings of antichamber of Cave 2 has been done.

The mending work was carried out successfully in Caves 1,2,3,4,5,6,9, 19 and 26 on the missing portion of sculptures and cracks on the stone with a suitable combination of similar stone powder, earth colours and polyvinyl acetate emulsion. In some contoured portions of the sculpture, strength was provided with steel pins.

In Cave 10, the chemical treatment of ceiling stone has been carried out by applying paper pulp method dipped in alcoholic solution of sodium or ammonium bicarbonate, EDTA and a few drops of ammonia and allowed to remain in contact for two hours for the removal of whitish accretion. After removing the pulp, the surface was washed with methanol using soft nylon brushes. After complete drying the stone surface was preserved with 1.5 % solution of polyvinyl acetate in toluene.

50. Ellora Caves, Ellora, District Aurangabad

In Cave 12, the conservation work involving fixing, filleting, consolidation of loose painted plaster and chemical cleaning of the paintings in the main shrine of the first floor was taken up during the year. The paintings were covered with hardened soot, cemented dust and dirt. A solvent system having diacetone alcohol, cellosolve, ethylene glycol, di-butyl phthalate, D.M.F., morpholine, methanol, toluene, butyl lactate, n-hexane in suitable proportion and with little ethylene diaminetetra acetic acid was found effective for the removal of accretionary deposits. An area of 2.75 sq m has been chemically cleaned and the remaining work is in progress.

51. Cave 16, Kailasa Temple, Ellora, District Aurangabad

The chemical conservation has been commenced on the upper exterior stone sculptures of the main Kailasa Temple, for the removal of

micro-vegetation, dust, dirt, and brid's excreta. Remains of lime-plaster cause the painting surface to peel off. The loose pieces at the top of *sabha mandapa* were attended to. The lion and the *gopuram* portions were fully consolidated. The loose and about-to-peel off portions of the lime-plaster have been fixed, filled and edged properly. Chemical cleaning was done with a mixture of 2 to 3% aqueous ammonia and aqueous non-ionic detergent using coir brushes or soft nylon brushes. White calcarious deposits were removed with 1% aqueous solution of acetic acid and washed with 1% aqueous non-ionic detergent with gentle brushing. The cleaned dried surface was given fungicidal treatment with 2% aqueous solution of sodium pentachlorophenate. The treated surface was preserved with two component systems applying first coat of a very dilute aqueous solution repellin super (potassium methyl siliconate) and after it's drying a second coat of 2% solution of polymethyl methacrylate in toluene. The work is in progress (pls. 213-214).

52. Shaniwarwada, Pune, District Pune

The chemical conservation work of the main gate, either side of bastions and paintings on the niche of the main gate and near the booking office of the monument have been taken up. Chemical cleaning was carried out for the removal of dust, dirt, bird's excreta and thick growth of micro-vegetation adopting physico-chemical method using 2% aqueous ammonia and 1 % non-ionic detergent. White calcarious deposits and graffiti etc. have been removed with 0.5% aqueous acetic acid and 1% non-ionic detergent. The cleaned surface was given fungicidal treatment with 2% solution of sodium pentachlorophenate, followed by preservation with 3% solution of polymethylmethacrylate in toluene. The hollow joints of stone blocks were filled up with suitable filler, loaded with polymer compounds.

The wall paintings on the interior and exterior sides of the main gate were effected due to deposition of dust, dirt, bird's and insect's excreta and varnish marks. Peeling and loss of small fragments of paintings was also noticed at many places. Paint layer was fixed with 3% solution of PVA. The chemical cleaning was carried out with diacetone alcohol, cellosolve, methanol, butyl lactate, etc., in suitable proportion. The cleaned paintings were preserved with 1 % solution of PVA in toluene. A total 64 sq m of paintings and 676 sq m of stone surface have been chemically conserved.

53. Elephanta Caves, Gharapiri, District Raigad

The chemical conservation of stone sculptures of Caves 1, 3 and 4 has been carried out for the removal of salt deposition and dust, dirt which was cemented at some places. Chemical cleaning was done with 2% aqueous solution of ammonia and 1% aqueous non-ionic detergent. Penetrated salt was removed with repeated application of paper pulp soaked in distilled water. The colour matching to tone down the effect for restored portion was also done. The cleaned, dried surface was preserved with 3% solution of polymethyl methacrylate in toluene.

PLATES 213-214



213



214

Kailasa Temple, Ellora, panel showing Siva : 213, *before* and 214, *after chemical conservation*

ORISSA

54. Rock-cut Image of Bishnu, Rasol, District Angul

The chemical cleaning has been carried out for the removal of dust, carbon deposits and moss etc. using a 2% solution of ammonia and non-ionic detergent. The cleaned surface was given fungicidal treatment of 2% aqueous solution of sodium pentachlorophenate and preserved with two coats of 1.5% solution of poymethyl methacrylate in toluene. The work has been completed.

55. Chausatti Jogini Temple, Ranipur Jharial,District Bolangir

The chemical treatment work was carried out for the removal of vegetational growth like moss and lichen, using 1-2% solution of ammonia mixed with 1.5% non-ionic detergent by gentle brushing with soft nylon brushes. At some places hard deposits of moss and lichen were removed after longer duration or treatment covering the affected area with cotton swabs soaked in liquid ammonia. The treated surface was given fungicidal treatment by spraying 1 % solution of sodium pentachlorophenate and preserved with 1 % solution of perspex in toluene. The work has been completed.

56. Chausathi Yogiivi Temple, Hirapur, District Khurda

The chemical cleaning work was carried out for the eradication of thick micro-vegetational growth, dust, dirt and oily accretions using 2% solution of ammonia with liquid detergent. The clay pack treatment using bentonite clay, liquid detergent, ammonia and H_2O_2 was also given to the firmly adhered oily accretions. The surface was thoroughly washed with water. The cleaned surface was sprayed with 2% sodium pentachlorophenate as fungicidal treatment. The treated surfaces were preserved with 1:30 aqueous solution of repellin super. The work has been completed.

57. Muktesvara Temple, Bhubaneswar, District Khurda

The chemical treatment work was carried out on the inner portion of' *jagamohana* of the above temple for the removal of moss and lichen, using a mixture of 1-2% ammonia and 1.5% non-ionic detergent. A solution of 1 -2% acetic acid was used for the removal of lime and oxalic acid was used for black patches. The cleaned surface was given fungicidal treatment with 1% solution of sodium pentachlorophenate followed by preservation with dilute solution of repellin super. The work has been completed.

58. Parvati Temple, Lord Lingaraja Temple Complex, Bhubaneswar, District Khirda

The *mukhasala* and *mandapa* portions were subjected to chemical cleaning using a mixture of 2% solution of ammonia and non-ionic detergent. A 2% aqueous solution of sodium pentachlorophenate was sprayed to arrest further growth of micro-vegetation. The cleaned surface was preserved with two component systems of preservative, using 1:30 aqueous solution of potassium methyl siliconate followed by a final coat of 1.5% solution of

polymethyl methacrylate in toluene. The work has been completed.

59. RAJARANI TEMPLE, BHUBANESWAR, DISTRICT KHLRDA

The jagamohana and Vimana of the temple were chemically cleaned for the removal of vegetational growth using dilute (1 -2%) solution of ammonia and non-ionic detergent. The black patches were removed by oxalic acid solution. The surface was thoroughly washed with water. The cleaned surface was given fungicidal treatment with sodium pentachlorophenate and finally preserved with two coats of PMMA solution in toluene. The work has been completed.

60. NARASINGHA TEMPLE, LORD JAGANNATHA TEMPLE-COMPLEX, PURI, DISTRICT PURI

The northern and southern sides of the temple were subjected to chemical treatment for the removal of dust, dirt and vegetative growth with a mixture of 2% ammonia solution and non-ionic detergent. Salt deposit on the southern side was removed by paper pulp treatment. The treated surface was given fungicidal treatment by spraying 2% aqueous solution of sodium pentachlorophenate. The northern side was preserved with 1:30 aqueous solution of repellin super and 1.5% PMMA in toluene.

61. SUN TEMPLE-COMPLEX, KONARAK, DISTRICT PURI

The southern side of Vimana, inner portion of *garbhagriha* and the structure of west plinth were subjected to chemical cleaning for the eradication of dust, dirt and thick growth of micro-vegetation. Dilute (1 -2%) solution of ammonia and non-ionic detergent was used for the removal of these accretions. The cleaned, dried surface was given fungicidal treatment with 1% solution of silico fluoride and finally preserved with two coats of 1-2% solution of polymethyl methacrylate in toluene. The work has been completed.

RAJASTHAN

62. METALLIC GATE, BHARATPUR, DISTRICT BHARATPUR

The chemical treatment and preservation work of this metallic gate which appears to be made of Ashta Dhatu was taken up for the removal of thick coats of green patina and also calcarious, silicious and other accretions using different chemicals and solvents *viz.* soduim potassium tartarate, sodium hexameta phosphate, citric acid and tartaric acid in suitable concentration. The work is in progress.

63. GHATESVARA MAHADEVA TEMPLE, BADOLI, DISTRICT CHITTAURGARH

The chemical treatment work was resumed on the south-west face of the temple for the eradication of vegetational growth, dust, dirt etc., using 3-5% solution of ammonia and non-ionic detergent. The lime-wash coats were removed with 1 % solution of acetic acid. The cleaned surface was treated with 2% solution of sodium pentachlorophenate followed by preservation with 2% solution of polymethyl methacrylate in toluene. The work has been completed.

64. Loose Sculptures and Ganesa Temple, Badoli, District Chittaurgarh

The chemical treatment work was undertaken for the removal of biological growth, dust, dirt and bacterial slime etc., with 2% solution of ammonia and non-ionic detergent. For lime-wash removal, 1% solution of acetic acid was used. The cleaned surface was subjected to fungicidal treatment with sodium pentachlorophenate and preserved with two component systems, i.e., first with repellin super in appropriate concentration and second with polymethyl methacrylate in toluene on dried surface. The work has been completed.

65. Shringar Chauri Temple, Badoli, District Chhittaurgarh

In continuation of the previous year's work (*1996-97,* p. 314), the remaining work was taken up for chemical treatment using 2-3% solution of ammonia and rankaline to eradicate the growth of moss, lichen, dust and dirt. Very dilute acetic acid solution was used for the removal of lime. The cleaned stone surface was given fungicidal treatment with 2% solution of sentobrite in water followed by preservation with 2% solution of polymethyl methacrylate in toluene. The work has been completed.

66. Jatashankar Mahadeva Temple, Chittaurgarh Fort, District Chittaurgarh

The chemical treatment work was carried out on the exterior surface of the temple decorated with beautiful sculptures and carving. These were chemically cleaned with 3-4% solution of ammonia mixed with non-ionic detergent. The cleaned surface was given fungicidal treatment with 2% solution of sodium pentachlorophenate. The surface was preserved with two component systems of preservative using repellin super (potassium methyl siliconate) followed by 2% solution of polymethyl methacrylate in toluene. The work has been completed.

67. Kumbha-Shyama Temple, Chittaurgarh Fort, District Chittaurgarh

In continuation of the last year's work *(1996-97,* p. 315), the remaining exterior area of the south-west face of the main *sikhara* was subjected to chemical treatment for the removal of moss, lichen and bacterial slime using 3-5% solution of ammonia and non-ionic detergent, rankaline. Lime coatings were removed with very dilute solution of acetic acid. The surface was thoroughly washed with plenty of water. The cleaned, dried surface was given fungicidal treatment with 2% solution of santobrite and finally preserved with two coats of 1 % solution of polymethyl methacrylate in toluene. The work has been completed.

68. Samidhesvara Mahadeva Temple, Chittaurgarh Fort, District Chittaurgarh

The work of chemical treatment and preservation was commenced in order to remove the accretions of micro-vegetational growth, dust and dirt using 3-5% solution of ammonia and non-ionic detergent rankaline. The lime coatings were removed with 1 -2% aqueous solution of acetic acid using chemico-mechanical methods. The work is in progress.

69. SAAT BEES DEORIES, JAINA GROUP OF TEMPLES, CHITTAURGARH, DISTRICT CHITTAURGARH

The chemical treatment work was carried out on the exterior surface of Saat Bees Deories in order to remove the micro-vegetational growth and other accretions using 3-4% solution of ammonia mixed with non-ionic detergent. The cleaned, dried surface was subjected to fungicidal treatment with 2% aqueous solution of sodium penta chlorophenate. The treated surface was preserved with two coats of 1% solution of polymethyl methacrylate in toluene. The work has been completed.

70. PUNDRIK-JI-KI-HAVELI, BRAHMPURI, DISTRICT JAIPUR

The wall paintings dating back to eighteenth century AD were subjected to chemical conservation in order to remove dust, dirt, smoke, cobwebs and old preservative etc. with soft sable hair brushes. To clean smoke and other deposition, a mixture of various organic solvents in suitable proportions were used. The filling of cracks, filleting, edging and consolidation of loose portions were carried out with plaster of Paris mixed with fevicol. Colour re-intergration was also done to achieve uniformity and proper matching. Finally the paintings were preserved with 1% polyvinyl acetate in toluene. The work has been completed.

TAMIL NADU

71. SRI MURUGANATHASVAMY TEMPLE, THIRUMURU-GANPONDY, DISTRICT COIMBATORE

The chemical treatment and extraction of soluble salts were carried out from the sculptures of the exterior walls of Siva and Parvati shrines. Chemical cleaning was done with solutions of ammonia and acetic acid. Soluble salts were extracted by paper pulp method until the surface was free from salts. The cleaned, dried surface was given fungicidal treatment with 1.5% sodium pentachloro-phenate and preserved with 2% solution of polymethyl methacrylate in toluene.

72. SRI NARASIMHASVAMY TEMPLE, DISTRICT NAMAKKAL

The chemical treatment work was carried out on the ceiling, pillars and walls in order to remove lime-wash, yellow-ochre, oily and sooty accretions respectively with 3% solution of acetic acid and ammonia, teepol mixture followed by washing with water. The entire surface was preserved with 2.5% solution of polymethyl methacrylate in toluene.

73. BRIHADISVARA TEMPLE, G.K.C. PURAM, DISTRICT PERAMBALUR

The chemical treatment work on the main Vimana and adjacent walls was carried out for the removal of vegetational growth of moss and lichen using an aqueous solution of ammonia and teepol in 3:1 ratio. The cleaned, dried surface was given fungicidal treatment with 1.5% solution of sodium pentachlorophenate. The surface was preserved with two component systems of preservation using Repellin Super (potassium methyl siliconate) followed by 2.5% solution of polymethyl methacrylate in toluene.

74. Rock-cut Vishnu Temple, Thirumayam, District Pudukottai

Chemical cleaning of sculptures, pillars, ceilings, lintels etc., was done for the eradication of lime-wash, oily and sooty accretions using 5% solution of glacial acetic acid and aqueous ammonia and teepol in the ratio 3:1. The entire area was subjected to preservation with 2.5% solution of polymethyl methacrylate in toluene.

75. Brihadisvara Temple, Thanjavur, District Thanjavur

The chemical treatment and preservation of the main Vimana covering an area of 8986 sq m was taken up as an additional work in connection with *Mahakumbhabhishekam* of this temple. The entire area was chemically cleaned with an aqueous solution of ammonia and teepol in 3:1 ratio for the extirpation of moss and lichen followed by application of fungicidal treatment with 1.5% solution of sodium pentachlorophenate. Finally preservative treatment was given using potassium methyl siliconate in 1:20 ratio and with 2.5% solution of polymethyl methacrylate in toluene.

UTTAR PRADESH

76. Khas Mahal and Golden Pavilion, Agra Fort, District Agra

In continuation of the last year's work *(1996-97,* p. 317), the painted marble surface on the interior of Khas Mahal which had turned yellowish brown due to the deposition of year old dust, dirt, smoke, soot and other particulate matter was subjected to chemical treatment. The cleaning was done with mild organic solvents and their mixture in suitable proportion using soft hog hair brushes and cotton swabs. Finally, the cleaned and dried paintings were preserved with 1% solution of polyvinyl acetate in toluene. The work is in progress.

77. Birbal Palace and Jodhabai Palace, Fatehpur Sikri, District Agra

The chemical treatment work was carried out on the exterior stone surface for the extirpation of thick layers of moss, lichen, dust, dirt using aqueous solution of ammonia and non-ionic detergent in suitable strength. The cleaned dried surface was subjected to fungicidal treatment with 2-3% solution of sodium pentachlorophenate followed by preservation with 2% solution of perspex in toluene. The work has been completed.

78. Buland Darwaza, Fatehpur Sikri, District Agra

Chemical cleaning of lime-plastered *burjis* and sandstone surface of Buland Darwaza was done with an aqueous solution of ammonia and non-ionic detergent in suitable concentration for the eradication of thick growth of moss, lichen and algae. After fungicidal treatment, 1 % aqueous solution of repellin super was applied and finally, the surface was preserved with 2% solution of perspex in toluene. The work is in progress.

79. Dome and Walls (on Masjid side), Fatehpur Sikri, District Agra

The lime-plastered and stone surfaces were subjected to chemical treatment in order to eradicate thick growth of moss, lichen, dust and dirt by using 2

to 3% solution of ammonia and non-ionic detergent with the help of soft nylon brushes. The surface was given fungicidal treatment with 2% solution of sodium pentachlorophenate and after drying, 1 % solution of repellin super was sprayed. Finally, the surface was preserved with 2% solution of PMMA in toluene. The work has been completed.

80. JODHABAI PALACE (INTERIOR), FATEHPUR SIKRI, DISTRICT AGRA

Chemical treatment work was carried out on the stone and plastered surface for the removal of moss, lichen, algae, dust, dirt and pariculate matter using aqueous solution of ammonia and non-ionic detergent. After thorough washing and drying, the surface was given fungicidal treatment with 2 to 3% solution of sodium pentachlorophenate. Finally, the surface was preserved with two coats of 2% solution of perspex in toluene. The work has been completed.

81. ITMAD-UD-DAULA, AGRA, DISTRICT AGRA

The treatment of painted plaster in the south-west and north verandah has been carried out in order to fix the bulged portions by injecting plaster of Paris in dilute adhesive solution. Flaked painted layers were refixed with 5% solution of polyvinyl acetate. The edges of paintings were fixed to the ground with plaster of Paris and suitably toned to the colour of the ground.

82. TAJ MAHAL, AGRA, DISTRICT AGRA

The chemical treatment of the red sandstone wall facing Yamuna was carried out for the removal of moss, lichen, algae, dust, dirt and other particulate matter using aqueous solution of ammonia and non-ionic detergent in suitable strength followed by fungicidal treatment with 2-3% solution of sodium pentachlorophenate. Finally, the surface was preserved with 2-3% perspex solution in toluene. Similarly, eastern and western red sandstone walls (interior) were also treated and preserved. The marble surface of the dome, the *burjis* and red sandstone surface of the *burji* have also been chemically treated for the removal of yellowish-brown deposition of dust, dirt, particulate matter and micro-vegetational growth. The surface was cleaned with mild ammonia and teepol solution in water with scrubbing pads and soft nylon brushes. Thereafter, the marble surface was given clay pack treatment for the removal of adherent accretions. The cleaned surface was subjected to fungicidal treatment with 2-3% solution of sodium pentachlorophenate followed by preservation with 2-3% solution of perspex in toluene. The work has been completed.

83. MAIN MAUSOLEUM AND ENTRANCE, SIKANDARAH, DISTRICT AGRA

The plastered surface of the dome decorated with coloured tiles and red sandstone was covered with micro-vegetational growth like moss, lichen and algae apart from other suspended particulate matter. The arch of the main entrance was infested with beehives. Chemical treatment taken up on the above structures with mild solution of ammonia, non-ionic detergent and some other suitable chemicals using soft nylon brushes. The cleaned and dried surface was subjected to fungicidal treatment with 2-3% solution of sodium pentachlorophenate followed by preservation with 2-3% solution of PMMA in toluene. The work is in progress.

84. GROUP OF TEMPLES, JAGESHVAR, DISTRICT ALMORA

The chemical treatment work was carried out on left wing of the temple for the extirpation of thick deposits of moss, lichen, dust and dirt on the exterior stone surface using a solution of ammonia and teepol in suitable concentration. The surface was given fungicidal treatment followed by preservation with perspex in toluene. The work has been completed.

85. VOTIVE STUPAS AND EXCAVATED SITE, SARNATH, DISTRICT VARANASI

The chemical treatment work was taken up on the stupas situated on the north-east of the Dhamekh stupa and near the main shrine for the eradication of thick layers of moss, lichen, vegetational growth, dust and dirt using an aqueous solution of ammonia and non-ionic detergent by gentle scrubbing with soft nylon brushes. The work is in progress.

WEST BENGAL

86. LAL JI TEMPLE, BISHNUPUR, DISTRICT BANKURA

Chemical cleaning was carried out for the eradication of dust, dirt, greasy accretions and thick layers of different types of vegetation using an aqueous solution of 5% ammonia and non-ionic detergent. The surface was given fungicidal treatment to check the regrowth of microphytes followed by consolidation with repellin super in 1:50 ratio. Finally, the completed dried surface was preserved with 2% solution of polymethyl methacrylate in toluene (pls. 215-216).

87. RADHAY-SHYAMA TEMPLE, BISHNUPUR, DISTRICT BANKURA

The plastered surface as well as the laterite stone surface was subjected to chemical treatment for the extirpation of dust, dirt, greasy accretions and micro-vegetational growth. An aqueous solution of 5% ammonia and non-ionic detergent was found suitable for the removal of these deposits followed by thorough washing. The cleaned, dried surface was treated with 3% solution of sodium pentachlorophenate as fungicide followed by application of repellin super in 1:5 ratio. Finally, the surface was preserved with 2% solution of polymethyl methacrylate in toluene. The work has been completed.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS

88. ANTIQUITIES OF HAZARDUARI PALACE MUSEUM, DISTRICT MURSHIDABAD

(a) Iron objects including armours and statues were chemically cleaned for the removal of rust and other accretionary deposits using suitable methods and chemicals. Finally, armours and statues were preserved with petroleum jelly and rastoline.

(b) A Brass cannon was chemically treated with sodium potassium tartrate and polished with brasso.

'Information from: 88-93, the Director Science, Science Branch of the Survey; Dehradun; 94, the Directorate of Archaeology and Museums, Government of Andhra Pradesh, Hyderabad and 95, the Department of Archaeology, Government of Gujarat.

PLATES 215-216



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216

Lalji Temple, Bishnupur : 215, *before and* 216, *after chemical treatment*

(c) Wooden objects were first fumigated with carbon disulphide and then cleaned with alcohol and finally polished with suitable polishing material. Out of two hundred and eight items, seventy-nine items have been treated.

(d) Marble statues have been cleaned with clay pack treatment followed by thorough washing with water. Finally, these were allowed to dry and burnished with son muslin cloth. Out of thirteen items, six marble statues have been treated.

(e) Out of twenty-three paintings, seven paintings were chemically treated and conserved. Problems like peeling of pigments, weakening of old canvas, loss of adhesive between lining and ground, deposition of dust, dirt etc. were attended to. The paintings were relined with new canvas and appropriate adhesive. Retouching work was also done wherever necessary. Frames were coated with gold colour.

89. Archaeological Museum, Velha Goa, Goa

(a) The panel portraits were subjected to chemical conservation to attend to the following problems like deposition of cemented dust, dirt, peeling of pigment layer, yellowing of old varnish and insect activity in some cases. Mild organic solvents in suitable proportions were used for cleaning. The gaps were filled with the mixture of sawdust, plaster of Paris, fevicol and pyrethrum as an insecticide. Paintings were preserved with fresh coats of diluted picture varnish.

(b) The conservation work of wooden polychrome sculpture was taken up to stop severe insect activity and rusting of iron frame and nails. The rusted nails were replaced with strong and threaded steel screws for firm grip and fixed with epoxy resin. The sculptures were treated with pyrethrum and sodium pentachlorophenate solution in suitable base to stop insect activity. The insect-eaten portion was reconstructed by a mixture of sawdust, fevicol, plaster of Paris and matched suitably. The painted portions on the wooden sculptures were treated with a mixture of organic solvents in suitable portions. Finally, 2% solution of polyvinyl acetate has been used as preservative. The work has been completed (pls. 217-220).

90. Archaeological Museum, Halebid, District Hassan

About four hundred and three loose, reserve sculptures totalling 663 sq meter area were treated. The chemical treatment work was carried out for the eradication of vegetational growth, lime splashes and paint marks, filling of cracks, application of fungicide and finally for preservation, the chemicals and solvents like aqueous solutions of ammonia, neutral detergent, glacial acetic acid, oxalic acid, sodium carbonate, sodium pentachlorophenate, acrypol P876 clear pellets were used. The work has been completed.

91. Estampages From Epigraphy Branch, Mysore, District Mysore

In continuation of the last year's (*1996-97,p.* 322) work, the deacidification of the estampages was done using alcoholic barium hydroxide solution until pH value 7 was reached after repeated application. The estampages were repaired by way of mending the tears and strengthening the edges by striplining. The preservation was done using 1 % solution of polyvinyl acetate in toluence. The remaining work is in progress.

PLATES 217-218



217



218

Archaeological Museum, Old Goa, wooden sculpture : 217, *front and* 218, *back view before chemical restoration*

PLATES 219-220



219



220

Archaeological Museum, Old Goa, wooden sculpture : 219, *front and* 220, *back view after chemical restoration*

92. Chemical Treatment of Antiquities in The Zonal Laboratory Mysore

(a) twenty-five coins received from Thrissur Circle, Thrissur were chemically treated and preserved; (b) thirty-four coins retrieved from the excavated site at Kanaganahalli, District Gulbarga, received from Bangalore Circle, Bangalore, were chemically treated and preserved; (c) hundred copper coins received from the Director (Epigraphy), of the Survey, Mysore, were chemically treated and preserved.

The chemical treatment of copper coins has been done with alkaline Rochelle salt and dilute sulpturic acid. Lead coins have been treated with Amberlite resin and distilled water. The preservation of all the chemically treated coins has been done with polyvinyl acetate in toluene.

93. The holy Quran received from Red Fort Museum, New Delhi, containing about nine hundred pages was subjected to deacidification, fumigation, etc. The stiffness, the kinks and folds were removed by gentle pressing under mild hot pressure conditions before the papers were laminated. The papers were in much damaged condition and required lot of precautions during the restoration process.

94. The Directorate of Archaeology and Museums, Government of Andhra Pradesh, Hyderabad carried out chemical cleaning and preservation of thirty-one Victorian silver coins, forty-one punch-marked coins, copper plates, copper idols of Jaina Tirthankara, bronze idols besides, anklets and rings of copper which were received as treasure trove.

95. During the period under review, the Department of Archaeology, Government of Gujarat, carried out chemical conservation at the following monuments to eradicate micro-organism, vegetation, moss and oil paints from the affected area. Measures were also taken to prevent damages caused as a result of termite action.

0 Ganga Chhatri, Bhavnagar

ii) Portions of Haveli at Gandhinagar

iii) Lakhota Khota, Jamnagar

iv) Jumma Mosque, Uparkot, Junagadh

v) Gebansha step-well, Pavagadh

vi) Temples of Siva and Murali Manohara, Supedi, Rajkot

vii) Rock-cut cave, Khambhalida, Gondal, . District Rajkot

viii) Temple of Trinetresvara, Tarvetar, Chotila, Surendranagar

MONITORING OF AIR POLLUTION

1. Monitoring of Temperature and Relative Humidity at Ajanta

(i) The temperature and relative humidity have been recorded in Cave nos. 1,2,6, 16, 17 and 21 regularly, thrice a day, in order to study impact of micro-climatic variation on painted surface.

(ii) Cave nos. 9, 19 and 20 were subjected to fumigation to have control over insects and pest

[1] Information from: The Director Science, Science Branch of the Survey, Dehradun.

activity using ethoxide gas (a mixture of 10% ethyleneoxide and 90% carbon dioxide). The gas was allowed to remain in the airtight caves for about 36 hours. Different types of insects *viz.,* silver fish, flying insects, cockroaches, spiders, bats, rodents, Iizards etc. have been recovered dead due to the lethal action of ethoxide gas.

(iii) Insecticidal treatment has been regularly given fortnightly throughout the year to arrest the insect activity in the painted Cave nos. 1,2,9, 10, 16, 17 and 19. 2% pyrethrum extract solution mixed with kerosene oil has been sprayed in the cells and floor of the painted caves.

2. Monitoring of Air Pollution at Taj Mahal and other monuments, Agra

Atmospheric pollution has been considered as the prime contributing factor in the deterioration of monuments. The growth in industries and expansion of urban conglomeration has resulted in formidable increase in the local levels of aggressive airborne pollutants. Air pollution laboratory, Agra is therefore, periodically measuring the major environmental parameters with the aim to monitor the level of gaseous and other pollutants in ambient environment which are considered to be harmful for stone and other building materials of heritage building including World Heritage Monuments and Sites.

In addition to gaseous pollutants (sulphur dioxide and nitrogen oxide gases), suspended pariculate matter (SPM), dust fall rate and certain meteorological parameters *viz.,* temperature, relative humidity, wind speed and wind direction have been measured in the ambience of Taj Mahal, Red Fort and Sikandarah during the period under review. This has helped to enforce preventive measures and modify conservation strategy as per demand of the situation.

3. Meteorological Parameters

(i) The Wind Speed and Wind Direction: Wind speed and wind direction which provides valuable information about the directions and distances of the pollutants transported after being airborne. Wind speed and wind direction have been measured with the help of Wind Monitor (WM-200). The wind speed was measured in kilometers per hour. The wind direction during most of the time was noticed to be from the north-west.

(ii) Temperature and Relative Humidity: Temperature and relative humidity which are normally known as secondary factors for the dilution and dispersion of the various pollutants have been measured in the vicinity of monuments on periodical basis. Large variation in temperature and relative humidity are also responsible to create stress in the stone matrix which in turn may result in cracks and/or bulges etc. Monitoring helps to have better understanding about the interaction of the pollutants with the building material, finally governing the rate of chemical weathering of the stone.

4. Physical Parameters

(i) Dust Fall Rate: Dust particles act as a carrier for various harmful constituents of the pollutants and are mainly responsible for abrasion of the stone

surface. The dust fall measurement was recorded with the help of suitable instruments and values have been calculated in metric tones per square kilometer per thirty days.

(ii) Suspended Pariculate Matter: Suspended particulate matter which remains airborne for a longer period has been measured with the help of High Volume Sampler and Respirable Dust Sampler. The concentration of suspended particulate matter was calculated in ug/m^3 of air.

5. CHEMICAL PARAMETERS

(i) Sulphur dioxide and Nitrogen gases: SO_2 and NO_X being highly reactive to the marble and other building material as their representative acids have been measured on weekly pattern using suitable instrumentation. The concentration of SO_2 and NO, was reported in terms of ug/m^3.

(ii) Sulphation Rate: Sulphur dioxide gas in converted into sulphuric acid through a complex mechanism in the presence of calalysts, already available in the environment through an intermediate reaction step, i.e., formation of sulphur trioxide. To have better understanding of the proviso the sulphation rate was measured in terms of gms SO_3 / m^3 using suitable instruments and methods.

6. In order to study the impact of air pollution on the building materials of Red Fort as well as other structures of the fort, monitoring of ambient air quality was carried out during the period under review on the same lines as discussed above.

RESEARCH & ANALYSIS

1. The Chemistry Branch of the Survey carried out extensive studies, research and analysis under these various projects, the details of which are as under:

(i) Samples received from Hyderabad region Siva Keshavasvamy Temple, Pushpagiri, District Cudappa (Andhra Pradesh), for quantitative analysis of its various components.

(ii) Analysis of ancient lime-plaster samples from Qutb-Complex, Delhi and Begum Puri Mosque, New Delhi, were carried out for detailed chemical and physical parameters.

(iii) One lime-plaster sample from Tughluqabad Fort, Delhi, was analysed for the percentage composition of various constituents for its effective conservation done to evaluate the suitability of materials for relining purpose.

(iv) A sample of relining material used for the restoration and strengthening of the canvas painting of Hazarduari Palace, Murshidabad, West Bengal, was subjected to microscopic and I.R. studies for the identification of material. Chemical analysis of the sample was also done to evaluate the suitability of these materials for relining purpose.

(v) Hand-made paper and machine-made papers were studied under scanning electron microscope for their morphological and structural characteristics in connection with the conservation

of Archival material. Problems of foxing marks were also studied to establish a correlation between physical and chemical changes due to foxing.

(vi) Chemical analysis of a lime-plaster sample, from Itmad-ud-Daula, Agra, was done to determine percentage composition of various constituents.

(vii) Two samples of ash received from the excavated site of Rakhigarhi, Hissar (Haryana) were studied for spectrophotometric identification of different constituents present in the ash to find out its origin, i.e., whether it is charcoal ash or bone ash.

(viii) A sample of charcoal from the excavated site at Rakhigarhi, District Hissar, Haryana, was also studied using SEM for its morphological and anatomical characteristics. Studies of the sample revealed that the sample was wood charcoal, but the kind of timber could not be identified.

(ix) A stone sample from Sanchi Stupa, District Raisen, Madhya Pradesh, was studied with the help of SEM for its morphological as well as physico-chemical characteristics.

2. (a) In continuation of the previous year's *(1996-97,* p. 323) work of modification of mud adobe, required for repair and filling of cracks in the monasteries in Ladakh and Tabo (Himachal Pradesh), the studies for repair of mud-plaster was considered necessary to check further damage particularly at the time of change of ecology and environment of these regions by providing the mud structure a water repellent treatment to develop hydrophobic character. The laboratory studies were initiated with the preparation of test sample blocks using soil mixed with hydrophobic materials like lime, gypsum and other inorganic/organic polymers in different proportions. The blocks thus prepared were subjected to different physical and chemical testing. The studies were in progress.

(b) The growth, drying and dying cycles of micro-vegetations on the stone surface of monuments from multi-layered cushions according to the type and nature of particular lichen, moss or fungus were studied. The identification of these layers as well as their behavioural characterisation may provide sufficient information for further studies in the field. For this purpose a peculiar type of lichen growth collected from the stone surface of Bhubaneshwar and Konarak monuments were taken up as a case study and different physico-chemical studies were in progress.

(c) Studies are being carried out to develop a safe yet effective chemical method for the cleaning and preservation of lime-plaster. A new method using bleaching powder was evaluated in the laboratory which does not involve much brushing thus avoiding loss of uppermost layer and development of bruises over the plastered surface. Experiments were carried out to develop a suitable method for the consolidation of lime-plaster and studies were in progress.

(d) A number of water repellent/preservative products based on silane siliconates and silicones have recently been introduced in the conservation field. Studies have been initiated for their evaluation on terracotta, bricks, stones and lime-plaster etc.

(e) Studies are being carried out for the effective conservation and preservation of wood with modern techniques and material. Tests were carried out on the specimens having various types of conservation problems.

(0 The studies on preservation of excavated iron artificts with the use of inhibitors were in progress. It has been observed that the rate of corrosion is comparatively more in acidic soil as compared to basic soil. Parameters for the studies selected on the basis of literature, survey and studies were in progress.

(g) Studies have been initiated to develop a traditional preservative/protective coating referred to as *vajralepa* in literature, used on the stone surfaces of many monuments. The exact recipe of this coating is still unknown and is a subject of debate among conservation. Studies were in progress to prepare the coating with available natural products and literature.

XI. ARCHAEOLOGICAL GARDENS

KARNATAKA

1. HAMPI-COMPLEX, HAMPI, DISTRICT BELLARY

During this year, augmentation of irrigation water at Hampi-complex has been taken up and arrangement to lift water from Akka Gundu waste has been taken up and the work is in progress.

UTTAR PRADESH

2. MARRIUM'S TOMB, AGRA, DISTRICT AGRA

To enhance the aesthetic appearance of the monument, the returfing of lawn at Marrium's Tomb has been completed.

3. MEHTAB BAGH, AGRA, DISTRICT AGRA

Pursuant to the directions of the Hon'ble Supreme Court to develop a green belt around the Taj Mahal in 500 mt radius, to mitigate the pollution, the Horticulture Branch of the Survey formulated plantation scheme in conformity with the original layout of Charbagh pattern of the Mughal period, based on evidences found from recent excavations. In all, about twenty-five different species of the trees and shrubs were planted in ascending order from main axis on either side to enhance the visual effect. The work is in progress.

4. TAJ MAHAL-COMPLEX, AGRA, DISTRICT AGRA

To increase the biomass inside the complex for controlling the air and noise pollution, the renovation work of the shrubbrey boards of inner complex was taken up and completed. Also, to control the pedestrian movement and to enhance the linear view of the forecourt of Taj Mahal, the renovation work of the hedges along the main paths has been completed.

5. DILKUSHA PALACE, LUCKNOW, DISTRICT LUCKNOW

The garden development work at the Dilkusha Palace is in progress.

WEST BENGAL

6. COOCH BIHAR PALACE, DISTRICT COOCH BIHAR

The last phase of the garden development work has been completed.

[1] Information from: The Chief Horticulturist, Horticulture Branch of the Survey, Agra. During the period under review, the Horticulture Branch of the Survey, maintained one hundred and fifty gardens besides developing thirty-eight gardens.

XII. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. Indian Archaeology - A Review

During the period under review the Survey brought out two issues for the year *1991-92* and *1992-93*.

2. Memoirs of the Archaeological Survey of India

The *MASI* (No. 97), Further Excavations at Pauni by Amarendra Nath was published in addition to the reprinting of all the out-of-stock numbers under this series.

3. New Imperial Series

The Survey brought out thirteen out-of-stock issues under this series in this year.

4. Guide Books

Monuments of Kerala (in Hindi) was brought out besides the reprints of two guide books *viz., Taj Museum* (English) and *Old Goa* (English).

5. Annual Report on Indian Epigraphy

Two issues for the year *1986-87* and *1992-93* have been published during the year.

6. Corpus Inscription*™ Indicarum

Bharhut Inscription, Vol. II, pt. II and *Inscription of the Kalachuri-Chedi Era, Vol. IV, pt. I,* have been reprinted.

7. Special Publications

Two brochures *viz.*, On Care and Conservation and on the Monuments of the Jammu Region were brought out.

8. Miscellaneous

An Index to the *Annual Reports of the Archaeological Survey of India (1930-36)* and a Report of the Expert group on Archaeology were published during this year.

OTHER PUBLICATIONS

9. Gujarat

The Department of Archaeology, Government of Gujarat, brought out two pamphlets during the year under review. These are on i) Step-Well at Modhera, District Mahesana and ii) Rojadi Excavation, District Rajkot.

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